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SANDHI

THE THEORETICAL, PHONETIC, AND HISTORICAL
BASES OF WORD-JUNCTION IN SANSKRIT

by

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1962
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PREFACE

This study was originally intended as a guide for students; but as its preparation proceeded the need for further research and rethinking became increasingly evident. The result is something between a handbook and a monograph, which, whilst it will undoubtedly prove less attractive to the student, may appeal to a wider range of interests in Indian and general linguistics. One particular aim has been to give due weight to certain rare or "anomalous" occurrences, which are statistically and pedagogically of minor importance, but which preserve valuable evidence for systematic statement and explanation.

As a result of distinguishing the various descriptive and historical levels of statement, it may seem that sandhi has been made an even more complicated subject than before. If so, it is perhaps a salutary consequence; for in traditional philology factual simplicity has often been achieved at the price of conceptual confusion. The following, for example, is a typical 19th-century statement:

> Final *m* is a servile sound, being assimilated to any following consonant... It remains unchanged only before a vowel or a labial mute.

Though acceptable in the climate of its age, such a formulation, quite apart from its terminology, will hardly bear scrutiny in a period of more sophisticated theory. A restatement on the following lines, whilst it is admittedly longer and states no more in the way of "facts", could at least claim to be conceptually more disciplined:

> Final *M* has a variety of alternants, which are largely homorganic with a following consonant.... The terminal alternant is *m*, but this otherwise occurs only before vowels (and homorganically before labial stops).

In many cases the extra length results in greater generality, and so is justifiable by the Indian grammarian's principle of economy,

that "The multiplication of rules is more prodigal than prodigality of words".[1] There will in fact be occasion to note that our treatment has sometimes been anticipated, in detail or principle, by Pāṇini, rather than by traditional western grammars or even the ancient Indian phoneticians. This circumstance reflects both Pāṇini's remarkable modernity and a certain community of purpose between his work and the present, which is concerned not to teach every detail of sandhi but to trace whatever more or less general principles underlie them; in P. Thieme's words,[2] "The Prātiśākhyas, if they wanted to do justice to their task, could not but state the case in full; Pāṇini's interest, on the other hand, which is a scientific and not a practical one, centres on such grammatical phenomena as are determined by definable conditions.... The Prātiśākhyas introduce general characteristics solely, it seems, in order to save labour.... Pāṇini characterizes for the sake of characterizing."

Certain of the more specialized problems might normally have been better suited to individual discussion in the journals. But since a somewhat untraditional framework had to be erected for the present study, it seemed both more economical and more coherent to discuss them within it, rather than to multiply theoretical preliminaries by restating them for each of a number of separate articles.

It is inevitable that one who is not primarily a Sanskritist should rely for much basic material on the works of past and present Sanskrit scholars. Numerous references to these appear in the text and footnotes, but one may mention with a sense of particular indebtedness Whitney's *Sanskrit Grammar* and editions of the *Atharvaveda-* and *Taittirīya-Prātiśākhyas* (*JAOS* vii and ix); Macdonell's *Vedic Grammar*; Wackernagel's *Altindische Grammatik* (I. *Lautlehre*) with Debrunner's *Nachträge*; Renou's *Grammaire de la Langue Védique*, *La Grammaire de Pāṇini*, and *Terminologie Grammaticale du Sanskrit*; Thieme's *Pāṇini and the Veda*; M. D. Shastri's edition of the *Ṛgveda-Prātiśākhya*; Lanman's *Vedic Noun*

[1] Nāgojībhaṭṭa, *Paribhāṣenduśekhara* (ed. Kielhorn), cxxi ("*padagauravād yogavibhāgo garīyān*").
[2] *Pāṇini and the Veda*, 60f.

Inflexion (*JAOS* x); Grassmann's *Wörterbuch zum Rig-Veda*; Oldenberg's *Die Hymnen des Ṛigveda* (I: *Metrische und textgeschichtliche Prolegomena*); and Bloomfield & Edgerton's *Vedic Variants* (II: *Phonetics*).

I am grateful to Professor Sir Harold Bailey, who read the work in manuscript and made a number of valuable comments, particularly on the Iranian side; and to the Editor and Publishers of *Janua Linguarum* for accepting it into that series.

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March, 1961

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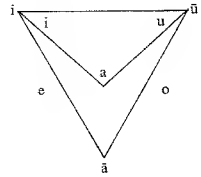
THE PHONEMES OF SANSKRIT

(Bracketed are elements for which, though they are recognized by special symbols in the Devanāgarī script, phonemic status is not established: cf. p. 16 n.10)

CONSONANTS:

				Velar	Palatal	Retrofl.	Dental	Labial	
stops	oral	Voiceless	Unasp.	k	c	ṭ	t	p	
			Asp.	kh	ch	ṭh	th	ph	
		Voiced	Unasp.	g	j	ḍ	d	b	
			Asp.	gh	jh	ḍh	dh	bh	
	Nasal			ṅ	(ñ)	ṇ	n	m	
Semivowels					y	r	l	v	(cf. p. 35n.16)
Fricatives				((h̤))	ś	ṣ	s	((h̤))	(cf. p. 78)
Breathings		Voiceless	(h̤)						(cf. p. 75n.18)
		Voiced	h						

VOWELS:



plus 'semiconsonants'

ṛ, ṝ and ḷ

and diphthongs ai, au (cf. pp.31ff.)

Also nasalized (aṃ), (ṝṃ) etc. (cf. p. 81n.31).

ABBREVIATIONS (OTHER THAN JOURNALS)

AP — *Atharvaveda-prātiśākhya.*
Oldenberg — H. Oldenberg, *Die Hymnen des Ṛigveda*, I.
P. — Pāṇini, *Aṣṭādhyāyī.*
PAI — W. S. Allen, *Phonetics in Ancient India.*
Renou — L. Renou, *Grammaire de la langue Védique.*
RP — *Ṛgveda-Prātiśākhya.*
RV — *Ṛgveda.*
Thieme — P. Thieme, *Pāṇini and the Veda.*
TP — *Taittiriya-Prātiśākhya.*
Variants — M. Bloomfield & F. Edgerton, *Vedic Variants*, II.
Wackernagel — J. Wackernagel (-A. Debrunner), *Altindische Grammatik.*
Whitney — W. D. Whitney, *Sanskrit Grammar.*

On typographical conventions see pp. 22, 23f. (and notes 35f.), 24f., 33f.

INTRODUCTION

The broad significance of the terms "junction" and "juncture" is sufficiently self-evident; but their technical usage in linguistic literature is liable to considerable and often unnotified variation from one school or author to another; and this indeterminacy is extended to "sandhi" through its common equation with "junction".[1] The consequent danger of misunderstanding may be minimized if one begins by making explicit certain underlying conceptions which contribute to the meaning of "sandhi" in this work.

The "rules" of sandhi in Sanskrit,[2] as in any language, are made necessary by the fact that a given grammatical unit — word or morpheme — does not have precisely the same phonetic form in different immediate environments; and this phenomenon is particularly liable to notice when the variations involve phonemic differences. Thus in English the morpheme of "plurality" takes different forms in "cats" (voiceless *s*), "dogs" (voiced[3] *z*), "horses" (*z* preceded by *i*), "oxen" (syllabic *n*), and "sheep" (zero); a word such as "four" has different forms in "four pears" (*fo:*) and "four apples" (*fo:r*).

The variant forms are known as "alternants", and two main types of alternation may be recognized. In the first, the variation is determined by the phonetic environment, and may be either "automatic" or "non-automatic" accordingly as it applies to all or only to some classes of relevant[4] words or morphemes. For

[1] cf. M. Joos, *Readings in linguistics*, 216.
[2] Where it is not necessary to distinguish between the Vedic and classical languages, "Sanskrit" is used as a cover-term for both.
[3] Using "voice" in a broad sense to include its concomitant features; in fact for most English speakers the *z* in such cases is voiceless but lax.
[4] "Relevant" is the sense of having the phonetic characteristics (e.g., a particular final vowel or consonant) which are liable to the alternation in question.

example, the alternation in English of *eə* (before consonant) ~ *eər* (before vowel), as in "pear-tree" ~ "pear-orchard", is automatic; but the alternation *o:* ~ *o:r*, as in the case of "four", is shown not to he automatic hy cases such as "raw pears" ~ "raw apples", with non-alternating *o:*. The classes involved in a non-automatic alternation may either be lexical (as here) and so require listing, or, as in some languages, grammatical, i.e. coinciding with particular grammatical categories.[5] But in all these cases the alternation is determined, regularly or not, hy a purely phonetic environment (in the above examples, following consonant ~ vowel), and is generally termed "morpho‹pho›nological" or "morpho‹pho›nemic"

In the second type the alternation depends not upon any phonetic environment, hut simply upon the selection of neighhouring morphemes without regard to their phonetic form, heing applicable to one or more (hut by definition not all) of these. Thus the zero plural alternant occurring with "sheep" is applicable to a small class of examples (including e.g. "deer", "plaice", "aircraft", "*pəli:smən*"), but the syllabic *n* alternant only to one ("ox"). Such alternation is sometimes termed "morpholexical". Since the variation in these cases is not phonetically determined, it is normal to find that the alternants have no phonetic similarity (e.g. zero and *n* have no similarity to *s* or *z*, whereas the latter pair differ only in respect of voice, and it is customary in such cases to speak of them as "suppletive" alternants.[6]

The distinction between these two main types may be clearly illustrated from Sanskrit hy the differing past participial forms

[5] See e.g. N. Trubetzkoy, *Das morphonologische System der russischen Sprache* (*TCLP* v. 2), § 84. For Sanskrit note the internal alternation of *-ṣ* (before vowel) ~ *-ṭ* (before *s*) in nouns, but *-ṣ* ~ *-k* in verbs: e.g. nominal *dviṣ-am* ~ *dviṭ-su* but verbal *dviṣ-ate* ~ *dvek-ṣi*.

[6] For further discussion of types of alternation see especially L. Bloomfield, *Language*, 210f.; Z. S. Harris, "Morpheme alternants in linguistic analysis", *Lg.*, XVIII, 169ff.; R. S. Wells, "Automatic alternation", *Lg.*, XXV, 99ff. — In traditional philology "suppletion" is generally used only to refer to morpholexical alternation in stem-morphemes (e.g. Skt. *paśyati* ~ *dadarśa*, Gk. ὁράω ~ δέδορκα). The phenomenon is in fact probably related to high functional burdening, and so particularly liable to appear in inflexional elements and in lexical elements of comparable frequency.

matta- and *panna-*: it is simply the selection of the roots *mad-* and *pad-* respectively that determines whether the suffix shall he *-ta-* or *-na-*, i.e. the *-ta-* ~ *-na-* alternation is morpholexical. On the other hand, the fact that the root takes the form *mat-* in *matta-* and *pan-* in *panna-* is a matter of morphophonological alternation, being determined by the nature of the suffixal initial, viz. *t* in the one case and *n* in the other.

The term "sandhi" is generally restricted to the morphophonological type of alternation, and is so limited in this study. We shall in fact treat only that particular class of morphophonological alternations which results from the juxtaposition of words ("external sandhi") as opposed to that of morphemes within words ("internal sandhi"). But in Sanskrit tbe general principles involved in external sandhi and in the sandhi of compounds are similar,[7] and there will be occasion to refer to the latter from time to time in so far as they may preserve an earlier form of external sandhi in a so-to-speak "fossilized" state.[8] Both external sandhi and that of compounds, however, show important differences from the internal sandhi applicahle to roots or stems hefore inflexional or derivational suffixes; for with certain exceptions the permitted phonetic sequences of internal sandhi are largely identical with those permitted within individual morphemes[9] and less restricted than those of external sandhi (see further p. 91).

There is wide variation between languages in the degrèe of alternation displayed by them; and the true extent of alternation may sometimes he concealed hy the nature of the orthographic system. In English, for example, the definite article is invariahly written "the", whether it refers to the preconsonantal alternant *ðə* or the prevocalic *ði*, just as the plural suffix of both "cats" and "dogs" is written "s". In Sanskrit the alternations are hoth extensive and

[7] As already expressly noted by *RP* i.61, *VP* i.153; cf. *PAI*, 65.

[8] For a concise and systematic statement of the differences see A. A. Macdonell, *Vedic Grammar*, 73–6; and for a fuller treatment Wackernagel, II.i, §§ 55–7.

[9] The exceptions apply more to derivational than to inflexional suffixes: cf. Wackernagel, III, § 3.

graphically transparent, and their notoriety has led to a wide adoption of the term "sandhi" in other language fields.

The Sanskrit system of spelling adheres almost completely to the phonemic principle[10] — whereby in English "cats" might appear as *kats* but "dogs" as *dogz* (*s* and *z* being distinct phonemes in view of their contrast in e.g. "lice" *lais* and "lies" *laiz*). The correspondence between the written and the spoken word in Sanskrit is entirely upon this near-phonemic level, with no tendency as in English to correspondence on a "higher", morphemic level (i.e. with invariant spelling for all occurrences of a given morpheme). Thus every phonemic variation in the expression of a word or morpheme is faithfully reflected in the Sanskrit orthography.

It is perhaps worth commenting, firstly, that the use of the expression "faithfully" in this context is not necessarily laudatory, since

[10] The only exceptions are the palatal *ñ* (see M. B. Emeneau, "The nasal phonemes of Sanskrit", *Lg.*, XXII, 86ff.), *ṃ* ("*anusvāra*"), and the voiceless breathing *ḥ* ("*visarjanīya*", with its sub-variants). The last is probably best considered as an allophone of the /s/ phoneme (cf. A. H. Fry, "A phonemic interpretation of visarga", *Lg.*, XVII, 194ff.). It is admittedly also in complementary distribution with the voiced *h*, and on grounds of phonetic similarity might be considered with it as an allophone of /h/ (as W. Bright, "A note on visarga", *Deccan Bulletin* XVIII, 271ff.); but *ceteris paribus* this would make for less simple junctional statements, and *ḥ* is exclusively a junctional phenomenon. There are certainly difficulties in the allotment of *ḥ* to /s/; but Bright's example of *puraskaroti* "he brings forward": *puraḥ karoti* "he makes towns" is no evidence for a contrast of *s* and *ḥ*, since a constituent analysis of sentences in which the two sequences occurred would readily indicate the difference in their status. Where both sequences are compounds, as in *tapaspatiḥ* "lord of austerities": *tapaḥpātram* "whose austerities have made him a fit recipient of honour", it is more difficult to deny the contrast; but probably in the majority of such cases the *s*-form involves a more "intimate" combination (cf. Whitney, § 171b: Renou, § 143) in terms either of frequency of occurrence or of the nature of the relationship (as it might, for example, be shown by a transformational type of analysis) — cf. H. Marchand, "Notes on nominal compounds in present-day English", *Word*, XI, 216ff.; R. B. Lees, "*The grammar of English nominalizations*", *IJAL*, XXVI, 3. II. The pattern, however, is certainly disturbed by the survival of archaic forms in which *s* is invariable (cf. p. 73). Similar considerations apply to *anusvāra* and, *pace* Emeneau, it seems undesirable to divorce it phonemically from *m* on the basis of the archaic *samrāṭ* and incomparables such as *camv-oḥ: saṃ-voḍhum* or *a-mlānam: saṃ-lāpaḥ*. Neither *anusvāra* nor *visarjanīya* appear in Pāṇini's *Śivasūtra*, and both are classified amongst the "dependent" sounds by the Prātiśākhyas (cf. *PAI*, 16).

an exclusively phonemic system has many disadvantages;[11] and secondly, that the completeness of the correspondence in Sanskrit is no reason for confusing the written and the spoken word;[12] the sandhi-alternations are explicable only on the basis of phonetic constraints. We shall, however, only be concerned with phonemic alternations and such non-phonemic ("allophonic") variants as have been recognized in the system of writing (e.g. the palatal *ñ* and *visarjanīya*); no account will be taken of other features such as *svarabhakti* (anaptyxis), or *yama* (faucal plosion), which are known to us only from the statements of the Prātiśākhyas.[13]

The sandhi-alternations of Sanskrit are concerned in the large majority of cases with variation at the end of one word determined by the nature of the following initial. In so far as it is the finals that vary and the initials that are mostly invariable, one may speak of the word-final position in Sanskrit as being relatively "weak".[14] Thus the word for "horse" may appear in such various alternants forms as *aśvaḥ, aśvas, aśvaś, aśvo, aśva*; and the word for "that" as *tat, tad, tac, taj, tan, tal.*

Such "weakness" of finals is widely attested in Indo-European languages outside Sanskrit, and is probably to be attributed, in terms of information theory,[15] to the high redundancy and low information-content of the end-portions of words and morphemes.[16] Speech occurs in time, and as each element is uttered the next

[11] See especially J. Vachek. "Two chapters on written English", in *Brno Studies in English*, I, 7ff.

[12] cf. G. Hammarström, "Graphème, son et phonème dans la description des vieux textes", *St. Neoph.*, XXXI, 5ff.

[13] cf. *PAI*, 73ff.

[14] cf. M. Grammont's "loi du plus fort" (e.g. *Traité de phonétique*[3], 185ff.), but with A. Martinet's reservations (*Word*, IX, 10).

[15] For a short non-technical account of the concepts see P. Guiraud, *Problèmes et méthodes de la statistique linguistique*, ch. VI (also in *JPs.*, IV, 302ff.); C. F. Hockett, *A manual of phonology*, 214ff. (also *Lg.*, XXIX, 69ff.).

[16] The apparently contradictory case of "initial mutation" in Celtic is primarily a feature of closely connected words (cf. R. Thurneysen, *Grammar of Old Irish*, 140, § 229), where external sandhi-phenomena are liable in any case not to apply (as occasionally in Sanskrit: cf. p. 49). Martinet, *Lg.*, XXVIII, 216, makes the point that the classes of words which were subject to initial "lenition" could rarely occur at the beginning of an utterance.

becomes correspondingly more predictable, i.e. redundant.[17] This, as everyone knows from experience, applies to some extent to the words in a sentence;[18] but it is also relevant to the phonemes within words and morphemes; and in inflected words the phonemic redundancy at the word-end will generally tend to be greater than that at the end of the stem, since inflexional morphemes form a relatively small class as compared with the lexical, stem morphemes, and tend to be more closely determined by their syntactical relationships.[19] The initial position, on the other hand, is the least redundant, so that at the junction of words or morphemes there is an informational "caesura" representing the transition from highest to lowest redundancy;[20] the abruptness or otherwise of this

[17] From the hearer's point of view this serial increase in redundancy may be partly offset by the brain interpreting sentences not phoneme by phoneme or even word by word, but "deferring judgement" over more or less extended sequences which are then interpreted "en bloc" — so that there can be "retrodiction" as well as prediction (cf. Jakobson-Fant-Halle, *Preliminaries to Speech analysis*, 44f.). In J. R. Firth's words (*TPS*, 1948, 152), "On the perception side, it is improbable that we listen to auditory fractions corresponding to uni-directional phonematic units in any linear sense"; considerable constraints are also imposed by "feedback" from other than phonemic levels of structure (cf. Fry & Denes, *Language & Speech*, I, 52f.). Seriality could also be disturbed in languages where accented non-initial syllables carry more phonological oppositions than the preaccentual.

[18] For experimental confirmation cf. P. Oléron, *JPs.*, IV. 329, 331 ("Pour une étude psychologique de la redondance"); F. Goldman-Eisler, *Qu. Journ. of Exp. Psychology*, CIII ("Speech production and the predictability of words in context"); Harris, *Lg*, XXXI, 212, § 6.4.

[19] cf. A. Martinet, *Économie des changements phonétiques*, 169f. This contrast may be partly offset by the generally greater length of stem-morphemes, which tends to increase their end-redundancy; but in fact in Sanskrit the stems are mostly quite short (verbal roots, for example, mostly have the structure CVC, which admits of considerable indeterminacy of the final: cf. *pac-*, *paj-*, *paṭ-*, *paṭh-*, *paṇ-*, *pat-*, *path-*, *pad-*, *pan-*, *paś-*).

[20] cf. D. B. Fry, "The experimental study of speech", in *Studies in Communication*, 147ff. (153: "The moments of greater uncertainty as to what the next sound is usually coincide with syllable and word junctures"); Hockett, *Lg.*, XXIX, 88; J. Vachek, *Sb. FFBU*, 1960, A8, str. 4, 87; C. E. Shannon, *Prediction and entropy of printed English* (Bell Syst. Tech. Pub., Monog. No. 1819), 6. Of considerable relevance is Harris's "From phoneme to morpheme" (*Lg*, XXXI, 190ff.), where it is shown that periodicities in the number of possible $(n+1)$th successors to the nth phoneme of sentences largely correspond to

transition may be one factor in establishing degrees of "intimacy" in word- and morpheme-junction, which may be reflected in differences of sandhi.[21]

It will be clear that whenever it is necessary to speak of alternation there is no such thing as THE form of a word — there are various alternating forms, all of which are equally representative of the word in their particular environments.

But any scientific statement aims at simplicity and generality, and it would be a tedious procedure to have to state each word in its various alternant forms whenever one wished to identify it. The practice has therefore arisen of selecting one of the alternants as "basic", in the sense that the others can be unambiguously derived from it by the application of appropriate rules. Such a method of statement, involving a process of "derivation", is sometimes termed "dynamic"; it contrasts with the "static" method,

word and morpheme boundaries — i. e. a peak represents a low transitional probability and so an increase in information.

[21] cf. p.16, n.10, and J. Kuryłowicz, *Esquisses Linguistiques*, 210f. (also *TIL*,II, 63n.); Hockett, *loc. cit.* Of interest in this connexion are Goldman-Eisler's findings on hesitation-pauses (*op. cit.*, 103f.): "... the hesitation-pauses ... were related to an aspect of objective language, namely transition probabilities dependent on word frequency in the language at large, linguistic structure and context"; subsequent experiments by the same writer ("The predictability of words in context and the length of pauses in speech", *Lang. and Speech* I, 226ff.) led to the further observation that (228) "transition probability or amount of information contained in the words of a sentence were shown to be related, not only to incidence, but also to length of hesitation pauses." These findings are suggestive with regard to the hypothesis, if valid, proposed by M. Joos and adopted by A. A. Hill (*Introduction to linguistic structures*, 21ff.), which relates degrees of juncture to degrees of prolongation; see however I. Lehiste, *An acoustic-phonetic study of internal open juncture* (Supp. to *Phonetica*, V), 42. Chomsky-Halle-Lukoff, "On accent and juncture in English" (*For Roman Jakobson*, 65ff.), establish a correlation of stress-patterning with the results of constituent analysis on higher levels; Bolinger & Gerstman, however, "Disjuncture as a cue to constructs" (*Word* XIII, 246ff.), find rather that it is "disjunctures" (=temporal "separation of syllable-centers") which supply the physical correlate "whose width corresponds inversely to the semantic bond". Cf. also Harris's remarks ("From phoneme to morpheme", 211f., § 6.3) on "degrees of independence" of successive words and morphemes (the lower the independence the lower the peak, and vice versa).

which simply lists the alternants appropriate to the various environments. The dynamic method, as might be expected, raises problems that the static method avoids; but this may as well be considered an argument for as against it.

It may happen that the alternant which permits of such derivation is also historically the oldest. Thus, in general terms, if we have the alternants x_1 and x_2 of the word "x" occurring respectively in the environments *a* and *b*, and if we find that from x_1 we can derive x_2 (but not, or not so simply, vice-versa), it may emerge that at an earlier period x_1 prevailed in both environments, i. e. in quasi-algebraic notation:

$$x_1ab > x_1a \sim x_2b.$$

In Sanskrit, for example, we find that final *-ai* before an initial consonant (as *tasmai dadāti*) alternates with *ā* before a vowel (as *tasmā adadāt*); from *-ai C-* we can unambiguously derive *-ā V-* (but not vice-versa, since *-ā V-* can also alternate with *-ās C-*). One therefore establishes *-ai* as the basic alternant in such words, and it is in fact known that at an earlier period the "diphthongal" value occurred before any initial, whether consonant or vowel.

In some cases, on the other hand, it may be impossible to say that one or the other form is historically earlier; or the historically earlier form may not be the most suitable as a basic alternant. Thus in the case of the English plural morpheme it is probable that *iz* represents an earlier form than (postconsonantal) *s* or *z;* but from the descriptive standpoint this would be no argument against setting up *z* as the basic alternant if the rules of derivation are thereby simplified.[22] The system of "basic alternants" is actually a central feature of sandhi statement already in the earliest Indian treatises; and the fact that no historical data were available to their authors in no way invalidates their descriptions. In some cases it may even prove necessary to establish a hypothetical basic form, which is attested in no actual environment; such a form

[22] Thus e. g. Hockett, *A course in modern linguistics*, 282, as against E. Nida, *Morphology*[2], 45. See also D. Jones, *An outline of English phonetics*[8], § 847; H. Sweet, *New English Grammar*, §§ 861, 997; O. Jespersen, *Linguistica*, 361ff.

may, but not necessarily, prove to be historically justified.[23]

By suitable selection or construction of basic forms it is possible to ensure that *all* derivational rules are regular, even in those cases where, in a "static" statement, the alternation is non-automatic (see p. 14)[24] For the relevant portion will appear in a different basic form for each class of word or morpheme. Thus in Sanskrit internal sandhi the alternation *jy* ~ *kt* (as in *yujyate* ~ *yukta-*) is shown to be non-automatic by the existence of e.g. *mṛjyate* ~ *mṛṣṭa-*, with the alternation *jy* ~ *ṣṭ*. The derivational rules can however be made regular and unambiguous by writing the basic final of the root in the first class with *j* but in the second class with some such symbol as *ź* (which would provide a parallel to e.g. *diśyate* ~ *diṣṭa-*, and would incidentally correspond to an Indo-European **ĝ* as against **g*). The advantages of the method from this point of view have been well stated and exemplified by M. Swadesh and C. F. Voegelin in their study of Tübatulabal.[25]

The process of deriving the various alternants from the basic form is a purely descriptive process; and the basic form is primary only in the sense that it enables the whole set of alternants to be most simply and unambiguously stated. Consequently to say that the English plural *z* "changes to" or "becomes" or "is replaced by" *s* after a voiceless sound is a misleading mode of statement unless these terms are specifically redefined. The most we can legitimately say is that from *z* (occurring after voiced sounds) is derivable *s* (occurring after voiceless sounds) — "The notions of past and

[23] Thus in internal sandhi the *r̄* set up for certain verbal roots by the Indian grammarians (cf. Whitney, § 242), which agrees with our reconstructions of Indo-European; on the method in Pāṇini see particularly H. E. Buiskool, *The Tripādi*, 12ff.

[24] In the case of English "four", for example, the alternant *fo:r* would be taken as basic.

[25] "A problem in phonological alternation", *Lg.*, XV, 1ff. ("We give T." (a Uto-Aztecan language of California)... "as a striking illustration of what may be accomplished by recognizing the nonpatent in synchronic phonology... The value of the theory is not merely that it is accurate, but that it provides an overlying general pattern (regular principles) to phenomena which otherwise could only be presented as a series of distinct, partial, limited patterns (rules and irregularities)").

future do not enter into functional explanation, as it occurs in the advanced sciences, at all; for there considerations of time-order are superseded hy considerations relating solely to structural order"[26]

The term "sandhi", therefore, is not to he taken as implying a *change* of the hasic form when it is set in particular phonetic environments. From the synchronic standpoint *all* the alternants are equally original in their several contexts. In this study an attempt has been made to avoid the all-too-common confusion between descriptive derivation and historical change, by using the symhol $\div$ for the former and reserving the usual $>$ (and $<$) for the latter. The two processes may and often will coincide — "The most efficient formulation of the synchronic facts is ordinarily not the same as a reconstruction of the actual historical developments, hut the process of constructing morpho-phonemic formulae has some resemhlance to that of historico-phonological reconstruction;" "alternations are the result of phonetic history"[27] — and in favourahle cases this fact makes possible the technique of "internal reconstruction".[28] But conceptually the two processes must he kept distinct; whether the static or the dynamic mode of statement is employed, sandhi remains a synchronic concept, namely the occurrence of words or morphemes in variants appropriate to their various environments.

There still remains an even commoner, though less obvious, source of possihle confusion. It is traditional and convenient to state a derivation in some such general form as $x_1 + b \div x_2 b$, where x_1 is the basic form, b the environment in question, and x_2 the alternant actually occurring in that environment. But it must be emphasized that the hasic form, whilst it may have the same structure as a particular alternant, is, when used in its function as a hasis for derivation, on a different conceptual level from any of the alternants.[29] Thus in the ahove formula, whereas the derived

[26] P. Gardiner, *The nature of historical explanation*, 3.

[27] Swadesh & Voegelin, *loc. cit.*

[28] See especially, H. M. Hoenigswald, "Internal reconstruction", *SIL*, II, 78ff; *Language change and linguistic reconstruction*, 99ff.

[29] cf. Wells, *loc. cit:* "Whatever a morphophonemic formula does mean, it does not mean any actual morph, and in this way differs essentially from a

x_2 is an actual alternant, x_1 is an ahstraction. When the so-called "hasic alternant" actually occurs in its own appropriate environment[30] (as it might he $x_1 a$), it is usual to assume that no statement of derivation is applicahle. But a rigorous method would demand that even here we should state $x_1 + a \div x_1 a$, since the x_1 on the left of the derivation is an ahstraction and not an actuality; a "hasic alternant" is simply an alternant which happens to have the same structure, hut not the same status, as the hasic form; it is "similar" to the hasic form rather in the sense that two "similar triangles" of different sizes are similar. And even if statements of the type $x_1 + a \div x_1 a$ are omitted as self-evident, the nature of the omission should be borne in mind. As an Indian grammarian might say, "the rules of grammar are like the rain; they apply whether or not any change is involved — as the rain falls alike upon the empty and the full".[31]

In derivations such as $x_1 + b \div x_2 b$ the ahstract nature of the basic x_1 may be said to be indicated hy the presence of the + sign. But in order to emphasize the conceptual distinction it seems desirahle to indicate its status typographically. The relevant elements of the hasic forms (i.e. those involved in the alternations in question) will therefore he printed in *CAPITAL* as opposed to *lowercase*.[32] Since a junction[33] involves two members, and since in Sanskrit it is generally the finals of the first word and the initials

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phonemic formula. For instance the morphophonemic formula bəlijf, although it looks just like the phonemic formula bəlijf, does not have the same meaning".

[30] Cf. the "*avaśaṃgama*" sandhi of *RP* iv. 1, glossed by Uvaṭa as "*avikāraḥ*", "non-transformation".

[31] *Paribhāṣenduśekhara*, 111 ("*parjanyaval lakṣaṇapravṛttiḥ*") with *Mahābhāṣya* on P. I. 2. 9. (Kielhorn I, 196. "*kṛtakāri khalvapi śāstraṃ parjanyavat: tadyathā parjanyo yāvad īnaṃ pūrṇaṃca sarvam abhivarṣati*").

[32] The relevant elements of our basic forms correspond in general status to the morpho(pho)nemes of the Prague school, and the use of capitals for these is traditional ("*Morphonème* — Idée complexe de tous les membres (deux ou plusieurs) d'une alternance": *TCLP*, IV. 322).

[33] "Junction" is used throughout simply in the sense of the juxtaposition of basic forms, "sandhi" being reserved for the occurrence of actual alternants (cf. above).

of the second that are relevant,[34] it is to these two elements and these only that the capitals will normally be applied.[35] Thus, as one might state for English *ðiS + Šop ÷ ðiš šop* ("this shop"), so our Sanskrit derivations will take such forms as *aśvaS + Carati ÷ aśvaścarati.*[36]

In some cases it is necessary to apply more than one derivational process in order to arrive at a given alternant; and the order in which the processes are applied may then be relevant. This factor of order has been a feature of the dynamic method from earliest times;[37] a notable modern exemplification is found in L. Bloomfield's account of sandhi-phenomena in the Algonquian Menomini language (of Wisconsin): the introductory remarks to this strikingly "Pāṇinean" work are particularly apposite:[38]

> The process of description leads us to set up each morphological element in a theoretical *basic* form, and then to state the deviations[39] from this basic form which appear when the element is combined with other elements. If one starts with the basic forms and applies our statements in the order in which we give them, one will arrive finally at the forms of words as they are actually spoken. Our basic forms are not ancient forms, say of the Proto-Algonquian parent language, and our statements of internal sandhi are not historical but descriptive, and appear in a purely *descriptive order.* However, our basic forms do bear some resemblance to those which would be set up for a description of Proto-Algonquian, and the rest, as to content and order, approximate the historical development from Proto-Algonquian to present-day Menomini.

[34] In fact we are generally interested in the second member only as an environment of the first, since our attention is focused on the alternations which apply almost exclusively to the first member.

[35] To avoid unnecessary complication the non-relevant (lower-case) portions will appear in their normal transcriptions; these portions correspond to the "pars communis" as opposed to the "pars propria" in Wells' terminology (*op. cit.*, 104; cf. also 107f.).

[36] In accordance with Sanskrit ms. practice (W.9B), the actually occurring sequences will not generally be divided into words; ambiguity of the roman transcription in cases of hiatus will be avoided by use of the diaeresis (thus e.g. disyllabic *aï* distinguished from diphthong *ai*).

[37] On Pāṇini see especially Buiskool, *op. cit.*

[38] "Menomini morphophonemics", *TCLP*, VIII 105ff. (§ 4).

[39] In accordance with our distinction of conceptual levels we should prefer "derivation" to "deviation".

It would be possible in such cases to distinguish graphically between presumed historical processes (indicated by >) and purely descriptive secondary derivational processes, which one might indicate by →. But since in the case of Sanskrit our intermediate forms nearly always in fact carry historical implications of a fair degree of certainty, the traditional > will normally be used unless it is expressly desired to avoid an historical interpretation (as when the historical evidence is inadequate or too remote, e.g. pre-Indo-Aryan).

The origins of morphophonemic alternation in Sanskrit lie for the most part in a general tendency to ease of transition between adjacent articulations — there is thus a peculiar if accidental appropriateness in the term "sandhi", which in addition to its literal sense of "synthesis" bears the figurative meaning of "harmony". The fact, for example, that a final stop in Sanskrit is voiceless before a voiceless initial and voiced before a voiced initial means that there is less complexity in the transition from the final to the initial than there would be if a voiceless final were followed by a voiced initial or vice-versa; a particular "relevant feature"[40] is maintained across the word-boundary instead of being abruptly transformed. The principal manifestation of this tendency is generally referred to as "assimilation" — from the point of view of static statement the term "similitude" would be more appropriate,[41] but the traditional process-term may be retained for dynamic, as for historical, statement, provided that these two uses are not confused.

In Sanskrit the tendency to final-assimilation is much greater at word junctions than elsewhere (thus e.g. *trivṛt-aḥ*, but *trivṛd asti* with voicing before vowel); this is a consequence of the greater "weakness" and so assimilability of the word-final position (cf. p. 17). It is also the case that in general the "intimacy" of connexion between two words is less than that between two morphemes within a word. This has the apparently paradoxical result that in

[40] See e.g. R. Jakobson & M. Halle, *Fundamentals of Language.*

[41] Though the term has been used in a rather different sense by D. Jones (*Outline*, ch. xxvi).

Sanskrit the less intimate the connexion the greater the similitude! It is however less paradoxical when stated in the form that the more intimate the connexion the more the combination tends towards the status of a single morpheme — i.e. the "less final" (and hence less "weak") the final of the first element tends to be — and so the greater the tendency for intramorphemic sequences to be maintained. The converse also applies — that certain *progressive* "assimilations" which are normal intra- and inter-morphemically are only attested in external sandhi where there is a particularly intimate connexion between the words (cf. p. 49), i.e. where the initials are "less initial" and hence less "strong". Similarly internal sandhi is more liable to reflect prehistoric developments for which the phonetic motivation is no longer evident, and thereby tends towards the synchronically "anomalous" and morpholexical (as e.g. *vahati* ~ *ūḍha-* beside *dahati* ~ *dagdha-*), whereas external sandhi tends rather towards the analogical and morphophonologically rational.

Apart from describing the sandhi phenomena, which is mainly a matter of methodology,[42] it is intended to explain them in terms of their phonetic motivation. It has long been realized that in this way it is possible to reduce many of the "rules" of sandhi from a collection of miscellaneous and arbitrary statements to a set of phonetically based principles; and the present study seeks to continue this process by revising existing hypotheses where necessary and by extending it to less evident cases. Where the proposed explanations are not immediately justifiable on general phonetic grounds, they will be supported by the quotation of parallels from other languages.

Traditional statements of Sanskrit external sandhi generally adopt as basic, and so providing the structure of the abstract basic forms, those alternants which occur at the end of a sentence ("*avasāne*", "*in pausa*",[43] where they are so to speak in an environment of following silence[44] (see p. 97). Arbitrary as this procedure may appear, it does in a majority of cases turn out to be appropriate. This can hardly be an accident; it is likely that the terminal[45] forms, with appropriate modifications, have spread at the expense of earlier non-terminal forms, though less widely than e.g. in Avestan, and in favourable cases one can trace the history of such developments (cf. pp. 75, 77, 88).

As a means of maintaining liaison with traditional accounts, the terminal finals here also will be taken as a basis for classifying the various types of junction; attention will then be drawn to the cases where these do not in fact constitute appropriate basic finals.

We have already shown that history is irrelevant to the establishment of basic forms. But in so far as we are here concerned not only to state but also to explain, it will be necessary to introduce certain historical considerations. For it is not invariably the case that an alternation can be explained on the basis of synchronic motivation. In English, for example, the alternation between *fo:* (before consonants) and *fo:r* (before vowels) has no immediate phonetic explanation. As demonstrated by the invariant *so:* ("saw") it is non-automatic; and in any case if it were a matter of avoiding hiatus, it is not evident, on general phonetic grounds, why *r* should be chosen to bridge it. The alternation is thus not synchronically explainable; it has an explanation, but a diachronic one: at an earlier period, as the spelling suggests, in the lexical class to which "four" belongs the *r* was present in all environments (as still in many dialects) and was subsequently lost before consonants. Similarly there is no clear motivation in classical Sanskrit for an alternation such as that of *te* before a consonant with *ta* before a vowel, and for a phonetic explanation we must go back to a period when *e* had a dipthongal value (see p. 31). Thus an alternation which was clearly motivated at an earlier stage may become fossilized and

[42] A most concise description in traditional terms has been given by M. B. Emeneau in his *Sanskrit sandhi and exercises*.

[43] Not so, however, Pāṇini; cf. pp. 91, 104 f.).

[44] "External open juncture" in the terminology of Bloch & Trager, *Outline of linguistic analysis*, 47.

[45] The term "terminal" is adopted from Hill (op. cit., 21) in preference to the traditional "pausal" (on which see p. 99).

the old rule continue to apply at a period when it is no longer phonetically justifiable.

Historical data will therefore be introduced where required in the interests of phonetic explanation;[46] and where Vedic sandhi differs from that of the classical language, one will generally devote the main attention to the former, since once the Vedic phenomena are explained, the classical explanation will normally be a simple matter of historical derivation. The diachronic factor inevitably involves certain additional problems of theory and presentation, including typography, which will be discussed in the first relevant context (see p. 33).

A majority of readers are most likely to be familiar with the presentation of sandhi in Whitney's *Sanskrit Grammar;* references are therefore given to the appropriate sections of that work (in square brackets, prefixed by W.). The use where suitable of representative examples cited by Whitney may further facilitate cross-reference; they have by now the merit of being "*mūrdhābhiṣikta*" in a context where originality would have no special virtue.

[46] A useful elementary introduction is F. Edgerton's *Sanskrit Historical Phonology* (Supp. to *JAOS*, LXVI. 1; also published separately as Offprint Series No. 19).

I

VOWEL + VOWEL[1]

[W. 126ff.]

The main principle of sandhi in this type of junction is that the utterances are generally characterized by absence of hiatus; there is thus a radical difference in most cases between the relevant sequences in the basic and sandhi forms. The principle is less rigidly observed in Vedic,[2] but in the classical language practically the only exceptions[3] are provided by certain small classes of words (termed "*pragṛhya*", "separable"), which regularly maintain a final vowel in all environments — e.g. the dual forms in *-ī*, *-ū*, or *e* [W. 138] (cf. p. 35, n. 18).

(a) *Similar vowels* [W. 126]

Of the derivational processes concerned with the absence of hiatus, the simplest is that which applies when the basic final and initial vowels are of similar quality, i.e. where both are close front, or close back, or open.[4] In such cases, to the sequence of two basic

[1] In all such junctional formulae the first item of course refers to the final of the first word of the junction, and the second to the initial of the second.

[2] Apart from the cases mentioned on p. 35, hiatus in Vedic is particularly common where the initial vowel is followed by a consonant group; it is also regular after *na* = "as", and is common after the enclitic *-ca:* see further pp 51, 75f. The regular writing in the *RV* of initial *ṛ* after an open vowel is, however, in most cases only graphic (unless the preceding vowel is also nasalized: cf. p. 67, and *Variants*. II, § 917); Pāṇini nevertheless reports it (vi.1.128) as the view of Śākalya that "before *ṛ* any simple vowel is maintained (with shortening if long)" — a view supported by some of the Prātiśākhyas (cf. Whitney on *AP* iii. 46).

[3] For some exceptions cf. S. K. De, "A note on hiatus in Epic saṃdhi", *IL, Bagchi Mem. Vol.*, 12ff.

[4] Strictly speaking the elements of a basic form cannot be phonetically classified, since they do not belong to utterance (cf. pp. 22f.). But it is often necessary to be able to refer to them by classes, and the simplest means of doing so is by

vowels there corresponds in sandhi a single vowel of the appropriate quality, and the process of deriving the latter from the former may be termed "combination". The resultant sandhi vowel is invariably long, since it corresponds at least to two short basic vowels:

Exx. *cA + Aprajaḥ ÷ cāprajaḥ*
atI + Iva ÷ atīva

It may also correspond to one short and one long vowel (in either order):

Exx. *nA + Āsīt ÷ nāsīt*
adhI + Īśvaraḥ ÷ adhīśvaraḥ
juhŪ + Upabhṛt ÷ juhūpabhṛt

or to two long vowels:

Ex. *rājĀ + Āsīt ÷ rājāsīt.*

Since only two degrees of length ("short" and "long") occur in Sanskrit,[5] the sandhi vowel cannot of course be more than long.

Although the short *a* is known to have had an appreciably closer quality than the long *ā* (approximately [ə] as opposed to [a:]), this does not prevent the correspondence of *A + A ÷ ā*. For although, as recognized by Pāṇini, from an absolute, phonetic standpoint the qualities of *a* and *ā* are different, they are both from a relative, phonological standpoint open vowels — *a* in relation to the short vowel system and *ā* in relation to the long.[6] A similar, historical correspondence is seen in Latin, where e.g. **ne (h)emo* > *nēmo* in spite of the fact that long *ē* was of closer quality than short *ĕ*. (cf. also Gk. ε + ε > ει [e:], ο + ο > ου [o:])

(b) *Open vowel + e, o, ai, au* [W. 127]

The process of combination applies also to another class of junction

applying to them the descriptive labels appropriate to the sounds represented by the corresponding (lower-case) letters of the actual transcription of utterances. This practice also results in the most economical statement of derivations.

[5] Excluding the protracted "*pluta*" vowels, which are limited to and expressive of certain special contexts of situation.

[6] Cf. Thieme, 89ff., 118ff; Allen, *PAI*, 57 and *Word*, XV, 241f.

which might at first appear to belong to a different category, namely where *A* or *Ā* is followed by *E* or *O* or the diphthongs *AI* or *AU*. What we transcribe for Sanskrit as *e* and *o* represent long mid vowels, front and back respectively; but we know that these must be descended from earlier diphthongal values. There is an indication of this in the related languages — to Sanskrit *veda*, for example, corresponds Greek οἶδα, Avestan *vaēdā;* and to Vedic *joṣṭar-* corresponds Old Persian *dauštar-*. Moreover the diphthongal values seem still to survive in one early Indian phonetic description.[7] The question then arises, how these diphthongs were distinguished from those whose descendants we in fact transcribe as *ai, au*, and which remained diphthongal into classical Sanskrit times. From the ancient description it appears that the distinction was maintained by a difference in the quality of the first elements; the diphthongs which later resulted in monophthongal *e, o* began with a vowel having the quality of short *a* (thus approximately [əi], [əu]), whereas those which resulted in *ai, au* began with a vowel having the quality of long *a* (thus approximately [ai], [au]). Some roman transcriptions recognize this fact by writing the latter, quite unnecessarily,[8] as *āi, āu*.

The matter may now be taken a stage further. The Sanskrit *e* and *o* show certain structural parallelisms with the sequences *ar*

[7] *PAI*, 63f. A variation between monophthongal and diphthongal values could be dialectal: cf. the similar variation in the value of *ai* and *au* in modern Hindi dialects. (e.g. C. H. Ferguson & J. J. Gumperz, *Linguistic diversity in South Asia*, *IJAL*, XXVI, 3. III, 110). It has sometimes been argued (first by Meillet, "La prononciation de *e* en védique", *MSL*, 18, 377) that the existence of optative forms such as *bharеyuḥ, bharеya* for expected *bharayuḥ, bharaya* (cf. Av. *barayən, baraya*) by analogy with *bharеḥ, bharet* etc., is proof that *e* already had a monophthongal value from earliest times. But analogical transfer of a diphthongal **ai* is equally possible — thus **bharai-ya* etc. after the analogy of **bharai-t* etc. (cf. Arc. ἐζελαύνοιαι (=—οι-ιαι) for expected—οα (<—οιαι) after —οις etc: Lejeune, *Traité de phonétique grecque*, 145f.). The normally expected result would then admittedly be *bharayya* etc. (see p. 32, n.10); but the analogy might well during the earlier period have caused the retention of the diphthongal **ai* before *y*, and this, with or without further analogical pressure, would monophthongize to *e* in the later period as before other consonants.

[8] Since in the transcription there are no other diphthongs with which they could be confused. Similarly some romanizations mark a macron over *e* and *o*, although there are no corresponding short vowels.

and *al*, which comprise a short *a* followed by a semivowel; this may be illustrated by a paradigm of the past participle, infinitive, and *s*-aorist of the three verbs *ji-*, *stu-*, and *kṛ-* :

jita-	*stuta-*	*kṛta-*
jetum	*stotum*	*kartum*
ajaiṣīt	*astauṣīt*	*akārṣīt*

The three forms in each row are grammatically parallel. If therefore, in the case of the second row, we consider the earlier period when the predecessors of Sanskrit *e* and *o* were still diphthongal, there is a grammatical advantage in analysing these as a sequence of short *a* and semivowel (*y* and *v* respectively, which are related to the vowels *i* and *u* in the same way as *r* is related to *ṛ*).[9] The analysis of *jetum* and *stotum* for that period will then be entirely parallel to that of *kartum* viz. **jaytum*, **stavtum*.

A further advantage of this analysis is that it renders transparent the internal sandhi alternation of *e* and *o* before a consonant with *ay* and *av* before a vowel — as e.g. *jeṣyāmi* = **jayṣyāmi* ~ *jayāmi* and *śroṣyāmi* = **śravsyāmi* ~ *aśravam*. It has then only to be stated that in the later language *ay* and *av* are monophthongized before a consonant (>*e*, *o*[10]) but preserved before a vowel.

From the paradigm it will also be seen that as *e* and *o* are parallel to *ar* (and as *i* and *u* are parallel to *ṛ*), so also the *ai* and *au* of the third row are parallel to *ār*. In fact the Indian grammarians themselves considered *e*, *o* and *ar* as of one grade ("*guṇa*"), and *ai*, *au* and *ār* as of another ("*vṛddhi*").[11]

[9] In the earlier period *v* had the bilabial value [w], the modern labio-dental value being a later development (but already Vedic: *PAI*, 57).

[10] Exceptions to the rule are found where *av* is followed by another semivowel. The sequences *vy*, *vr*, *vl* are possible word-, and so syllable-, initial groups, and are maintained internally: e.g. *gavya-*. Another exception is *ayy*; the *y* of the diphthong may here combine with the following *y* to form a double consonant which is maintained — as in *śayya-* or *kṣayya-* (but also *kṣeya-*). The *ayy* development is probably normal, and *ey* to be explained analogically; P. vi. 1.81f. notes semantic differences in doublets of this type. The double semivowel is also maintained in the rare cases where the second is a word-final sandhi alternant — thus *mayI* + *AUrasam* ÷ *mayyaurasam* (but *tE* + *Yugāni* ÷ *teyugāni*).

[11] For fuller discussion see Thieme, 111ff.

The sandhi alternations of Sanskrit are largely the fossilized remains of an earlier period, when *e* and *o* were still diphthongal; and for many types of vowel + vowel junction involving *E* or *O* (as basic initial or final), it is necessary first to convert these to an appropriate diphthongal form, with the suggested analysis **AY*, **AV*, if the derivations are to have a phonetic explanation. The resulting sandhi sequences must then of course also be considered as pre-Sanskrit, and be reconverted to their later values.

In fact there is theoretically no reason why, simply because the terminal alternants are *e*, *o*, we should establish *E*, *O* as basic in the first place; for in any case the derivations in vowel + vowel junctions would generally be more economically stated by reference to a "hypothetical" basic *AY*, *AV* — which may be more than hypothetical in the case of Vedic (cf. p. 31). But since all transcriptions employ *e*, *o*, regardless of date, it has been decided to accept *E*, *O* as basic, and to treat the diphthongal value throughout as a reconstruction; one will thereby avoid an all too possible confusion with the actual dipbthongs of the classical language (*ai*, *au*).[12]

In order to distinguish between historically reconstructed and descriptively attested or postulated values, in regard both to sandhi alternants and basic forms, reconstructions (hitherto noted by an asterisk) will be indicated by roman as opposed to italic type,[13] thus:

lower case italic	: attested sandhi alternants[14]
lower case roman	: reconstructed sandhi alternants
CAPITAL ITALIC	: basic forms for attested language
CAPITAL ROMAN	: basic forms for reconstructed language

The predecessors of Sanskrit *e* and *o* will accordingly appear as ay and av; and the corresponding conversions of *E* and *O* will

[12] cf. Oldenberg, 453, n. 3.

[13] Indo-European and Indo-Iranian reconstructions, however, will continue to be indicated as traditionally, in italic and with asterisk.

[14] And purely derivational intermediate forms, the non-attested status of which is adequately indicated by the presence of the → to their right (cf. p. 25).

appear as AY and AV. Similar considerations will apply to the actual diphthongs *ai* and *au*, and to their basic equivalents *AI* and *AU;* the conversions of the former will appear as āy and āv, and of the latter as ĀY and ĀV.[15]

For reasons of typographical simplicity roman will be used for the whole sequence when any portion or portions of it are involved in such conversions, in spite of the fact that the irrelevant portions will not undergo any reconstruction; it may thus happen that a roman form is in fact chronologically heterogeneous.

Since the alternations are largely of pre-Sanskrit origin, we should, from a strictly historical point of view, convert most junction into its earlier form, with appropriate typographical changes; and since the result of our derivations would thus be pre-Sanskrit, we should have to reconvert every such result into its attested Sanskrit form. It has not, however, seemed necessary to carry out these conversions and reconversions in cases where (as commonly) the same result would be obtained without them. But it should be remembered, as a matter of theoretical principle, that our notations in these cases may involve an abbreviation;

e.g. *atI + Iva ÷ atīva*

may really be an abbreviation of

atI + Iva < atI + Iva ÷ atīva > *atīva*;

and cases will in fact arise where such conversions are required by the derivational statement (cf. p. 36).

From the foregoing discussion it follows that when we have a basic final open vowel before an initial *E, O* or *AI, AU*, we are really dealing with a simple case of the junction of similar (open) vowels, since the initials are convertible to AY, AV and ĀY, ĀV respectively:-

Exx. *tavA + Eva* < tavA + AYva ÷ tavāyva > *tavaiva*
nA + Ojaḥ < nA + AVjaḥ ÷ nāvjaḥ > *naujaḥ*
mamA + AIśvaryam < mamA + ĀYś° ÷ mamāyś° > *mamaiśvaryam*
sĀ + AUtsukyavatī < sĀ + ĀVt° ÷ sāvt° > *sautsukyavatī*

[15] On *āy* and *āv* maintained before *y* (e.g. *panāyya-, bhāvya-*) see Renou, § 31.

(c) *Close vowel (including ṛ) + open vowel* [W. 129]

We may now proceed to those cases where the basic final and initial vowels are actually dissimilar, in the first instance by reason of a difference in aperture, i.e. open + close or close + open. In both cases the close vowel (whether short or long), as being inherently less prominent than the open, appears in sandhi in a "reduced", non-syllabic, semivocalic form (viz. *y, v,* or *r*).[16] Thus in the case of close + open (the so-called "*kṣaipra*" sandhi):

Exx. *itI + Āha ÷ ityāha*
yadI + Etat < yadI + AYtat ÷ yadyaytat > *yadyetat*
dhanĪ + Ojasā < dhanĪ + AVjasā ÷ dhanyavjasā > *dhanyojasā.*
mṛdU + Asti ÷ mṛdvasti
kartṚ + Asti ÷ kartrasti

In Vedic, however, metrical considerations show that it is only in a small minority of cases that this process of "reduction" is applicable; elsewhere the final syllable is maintained,[17] presumably with an appropriate intervocalic glide; the final vowel in such cases is short even where the basic final is long:

Exx. *patnĪ + Acchā ÷* Ved. *patni(y)acchā* (though written in the classical form *patnyacchā*).

A similar process of shortening in hiatus ("*vocalis ante vocalem corripitur*")[18] was probably applicable to all vowel + vowel junc-

[16] *r* (and *l*) would normally be classified as "liquids", and may be considered as "semivowels" in Sanskrit only in so far as the language possesses corresponding vowels. Final *r* is not in fact attested in the *RV*, where it seems to be replaced by *-ur* in the isolated *sthātur* (nom./acc.si.neut.) and *sanitur* (adv., beside *sanutar*): cf. Meillet, *Mél. Lévi*, 221ff., suggesting that this may represent an anticipation of Middle Indo-Aryan treatments of *ṛ*.

[17] The exceptions are mainly provided by the disyllabic prepositions, e.g. *prati, anu* (see further Renou, § 118).

[18] It is in fact possible that, in many cases at least, it is not a matter of the "shortening" of a long vowel, but of an original (? IE) prevocalic sandhi-alternation of *short vowel + laryngeal:* cf. F. B. J. Kuiper, "Traces of laryngeals in Vedic Sanskrit", *India Antiqua* (Festschr. Vogel), 198ff. Before an initial consonant this will have resulted in a long vowel, but before an initial vowel the laryngeal will have been lost (as regularly within a word), or perhaps more precisely in the case of the close vowels replaced by a semivocalic glide. Some

tions at an even earlier stage, but except in this particular type few examples have survived the processes of combination or reduction,[19] which are now seen to be historical as well as descriptive. The reason for its persistence here probably lies in the protective effect of the semivocalic glide which was automatically induced by a close vowel when followed by a dissimilar vowel; this would not have applied in the case of a final open vowel, or where the final and initial were similar. The distinction is already noted in Pāṇini (vi. 1.127), where the view is attributed to Śākalya that in Vedic "simple vowels other than *ă* are maintained before a dissimilar vowel, with shortening if long".

(d) *Open vowel + close vowel* [W. 127]

The process of "reduction" applies also to the junction open + close; but here the reduction of an initial *I*, *Ī* or *U*, *Ū* would result in a preconsonantal sandhi sequence *ay*, *av*. Such sequences, as we have seen, are to be considered as *pre*-Sanskrit and typographically indicated as such (thus: ay, av); from these their later monophthongal forms, *e*, *o*, may then be historically derived. And in order to account for the pre-Sanskrit nature of the sandhi, the basic forms also must be indicated as reconstructions, although their conversion in this case involves only a typographical change from italic to roman:

Exx. *tavA + Indra* < tavA + Indra ÷ tavayndra > *tavendra*
atrA + Īśvaraḥ < atrA + Īśvaraḥ ÷ atrayśvaraḥ > *atreśvaraḥ*

pragṛhya forms, i. e. with hiatus and no shortening, may have a similar explanation. Thus the dual *e* of fem. *ā*-stems and thematic neuters probably represents a combination of *ă* and *ī* (as found in athematic neuters). If *ī* is originally <**iʜ*, we shall expect a sandhi alternation with the following history: **aīʜC* ~ *aīʜV* > **aīC* ~ *aīyV* > ayC ~ ayyV > *eC* ~ *e(y)*V. The "*pragṛhyatva*" of *ī* and *ū* duals, as also of verbal duals (exceptional in Vedic) would then be analogical. Kuiper proposes a laryngeal explanation also for the partially *pragṛhya* locatives in *ī* of fem. *i*- (<**iʜ*-) stems, viz.* *iʜiC* ~ *iʜyV* > *iC* ~ *i(y)V*.

[19] e. g. *mA + Āpeḥ* ÷ Ved. *maāpeḥ* (though written *māpeḥ*).

This conversion is not required in the case of initial *Ṛ*, since the sandhi sequence *ar* is valid for the attested language:

Ex. *athA + Ṛṣiḥ ÷ atharṣiḥ*

The process of derivation must include in addition a shortening of the final vowel if in the basic form it is long; and this must be applied *before* the reduction of the initial to a semivowel. The derivational shortening has, as already noted, an historical analogue; but only in this case is shortening descriptively necessary for both Vedic and classical sandhi.

Exx. *rājĀ + Iva* < rājĀ + Iva ÷ rājaīva > rājayva > *rājeva*
rājĀ + Ūrjaḥ < rājĀ + Ūrjaḥ ÷ rājaūrjaḥ > rājavrjaḥ > *rājorjaḥ*
sĀ + Ṛddhiḥ < sĀ + Ṛddhiḥ ÷ saṛddhiḥ > *sarddhiḥ*

If we failed to apply the shortening process at the appropriate stage, the derivation from such a junction as *rājĀ + Iva* would be < rājĀ + Iva ÷ rājāyva > *rājaiva*, thereby showing a "*vṛddhi*" instead of a "*guṇa*" form of sandhi; for in rājāyva there is no hiatus to justify a shortening of ā > a, and preconsonantal āy regularly > *ai*.

It is to be noted also that in junctions of a final *Ă* with an initial *E* or *O* which represents in turn the sandhi of a junction of the preposition *Ā* with an initial *Ī* or *Ū*, the sandhi of *Ă + Ā* must be applied before that involving *Ī* or *Ū*:[20]

Ex. *upA + Ehi* < upA + AYhi = upA + Ā + Ihi ÷ upĀ + Ihi ÷ upaīhi > upayhi > *upehi*

If the reverse order were applied, the *vṛddhi* form would result (upA + Ā + Ihi ÷ upA + Aīhi > upA + Ayhi > upāyhi > *upaihi*).

(e) *e, o, ai, au + vowel* [W. 131ff.]

(i) Where the basic final is *E* or *O*, *AI* or *AU*, we do not in fact have to deal with a vowel + vowel junction. For phonetic explana-

[20] As already noted by *AP* iii.38 ("*ākāraḥ kevalaḥ prathamaṃ pūrveṇa*"); cf. P. vi. 1. 95; also in more general terms *RP* ii.7, *TP* v. 3.

tion and derivational economy require that here also these be converted to their pre-Sanskrit values, analysed as AY or AV, ĀY or ĀV respectively — an analysis that is in fact made for descriptive sandhi purposes by the ancient authorities (as P. vi.1.78). The first word in such junctions then ends in a consonant (semivowel Y or V), in the same way as a word ending in *AR*. But since in the prevocalic position also the resultant ay, av and āy, āv have special historical developments, it will be convenient to consider such junctions at this point, as well as for reasons of traditional classification.

Exx. *tE + Āgatāḥ* < tAY + Āg° ÷ (Ved.) *ta(y)āg°* > (cl.) *taāgatāḥ*
prabhO + Ehi < prabhAV + Ehi[21] ÷ *prabha(v)ehi*
tasmAI + Adadāt < tasmĀY + Ad° ÷ (Ved.) *tasmā(y)ad°* > (cl.) *tasmāädadāt*
ubhAU + Indrāgnī < ubhĀV + Ind° ÷ *ubhā(v)indrāgnī*

A statement such as tAY + Āgatāḥ ÷ *tayāgatāḥ*, with apparent derivation of an attested sandhi from a reconstructed junction is of course simply an abbreviation for tAY + Āgatāḥ ÷ tayāgatāḥ > *tayāgatāḥ*, avoiding the purely typographical conversion. The semivowels in such cases, however, were of a specially weak variety, particularly *y;* this is clearly stated by ancient sources,[22] and in the scribal tradition of the *RV* the *y* is regularly omitted (as always in the classical language), though often indicated in the Gānas of the SāmaVeda and occasionally elsewhere. Practice varies in the case of *v*, but it does not generally appear before a vowel of the same quality (*u, ū*); thus

tAU + Ubhau < tĀV + Ubhau ÷ tāvubhau > *tāübhau.*

Before other vowels it is generally maintained in the classical language after long *ā* and in the *RV* also after short *a;* there is, however, considerable disagreement amongst the ancient authorities.[23]

That the graphic hiatus had in at least some cases a phonetic basis is shown by the fact that in Vedic, by graphic and/or metrical evidence, it is occasionally resolved in conformity with the junctions of open vowel + vowel:

Exx. *tE + Indra* < tAY + Indra ÷ tayindra > *taīndra* > *tayndra*[24] > *tendra*
rāyE + Uta < rāyAY + Uta ÷ rāyayuta > *rāyaüta* > *rāyavta*[24] > *rāyota*
vAI + Asau < vĀY + Asau ÷ vāyasau > *vāäsau* > *vāsau.*

Such resolution is particularly frequent where the second word is *iva*, which has a close syntactical relation to the preceding word.

(ii) We have deferred consideration of those cases where a final *E* or *O* [W. 135] is followed by an initial short *A*, for the reason that a peculiar and more complex process is involved, which has given rise to much misinterpretation. In examples such as *tE + Abruvan* or *viṣṇO + Ava* we might expect the appropriate sandhi forms to be *ta(y)abruvan* or *viṣṇa(v)ava*. Cases of *-aya-* are indeed found outside the *RV*[25] (and the isolated *RV stotavE + Ambyam* ÷ *stotavaämbyam* is suggestive); but more often the Vedic sandhi appears as *-eä-* or *-oä-* respectively, i.e. with apparent maintenance of the "basic alternants". It is however significant that the syllables containing the *e* or *o* are here scanned as *light*, which would be expected if *-eä-, -oä-* in fact stood for *-a(y)a-, -a(v)a-* respectively. The hypothesis of a shortening in hiatus of monophthongal *e, o*

[21] The conversion of *Ehi* to AYhi would here be derivationally irrelevant though historically correct (cf. p. 33).

[22] cf. *PAI*, 68f. They were described by Śākaṭāyana (according to P. viii. 3.18) as "*laghuprayatnatara*", "having lighter articulation", or (according to *AP* ii. 24) as a case of "*leśa-vṛttī*"; the description "*leśa*" is also attributed to Vātsapra by *TP* x.23, where it is glossed as "*luptavad uccāraṇam*", "evanescent pronunciation". It does not of course apply in the case of e.g. *–A + YĀ–*, where the semivowel is initial and so represented by a strongly articulated *y*.

[23] cf. *TP* x.19ff; P. viii. 3.19.

[24] Since, unlike e. g. *tavA + Indra* (p. 36), *taīndra* and *rāyaüta* represent an attestable type of sandhi, and not simply basic junction-forms, the presumed next stage *tayndra, rāyavta* must also, in view of its historical posteriority, be considered as attestable; hence its indication here in italic and not, as e. g. tavayndra, in roman. The latter is admittedly an equal historical probability, (cf. p. 32f) but its recognition as such is not, as e.g. *tayndra*, logically essential.

[25] With a tendency to misinterpretation – e.g. *ṛtayā* (*ṛtE + Ā*) of *RV* vi. 7.1 rendered in *TS* i.4.13 as a dative *ṛtāya* (cf. Edgerton, *Studies in honor of H. Collitz*, 31f.).

may be ruled out,[26] since no monophthongization took place before vowels other than *a*, and there is no reason why it should here; the common writing of the finals as *ĕ*, *ŏ* in pedagogical works is therefore misleading.

In the classical language a further development takes place, giving rise to the sequences written *te'bruvan*, *viṣṇo'va* etc., with apparent "elision" of the initial short *a* (the so-called "*abhinihita*" sandhi). Since, however, such a phenomenon of "predelision" is practically unknown in Sanskrit,[27] this would seem an improbable explanation; and if we assume an earlier junction of the type -aya-, -ava-, as partially preserved in Vedic, a phonetically more probable development may be suggested. In the development of Middle Indo-Aryan there occurs a characteristic historical process whereby the Sanskrit medial sequences *aya* and *ava* were reduced to a monosyllabic, monophthongal (long) *e* and *o*, as e.g. *sthāpayati*, *avataraṇa-* > Prakrit *ṭhavei*, *oaraṇa-* (a process often referred to as "*saṃprasāraṇa*".[28] It is known from the ancient descriptions that already in Vedic in medial position intervocalic *y* and *v* were more weakly

[26] As also the fantastic suggestion of M. Bloomfield in *AJPhil*, 3, 15ff., which is effectively demolished by Oldenberg, 447ff. (see also Appx. A).

[27] Its postulation moreover either requires the erroneous assumption of prevocalic monophthongization, or fails to explain why such "elision" did not also take place in the case of final *AI*, *AU*.

[28] The term as used by Pāṇini refers primarily to his (intermediate) derivational process of vocalization of a semivowel before a vowel (e.g. *YA* ÷ *iā*: P. i. 1.45, exemplified in vi. 1.13ff.). This, however, is invariably linked with the further process of loss of the following vowel (*iā* → *i*, etc: vi. 1.108; cf. Edgerton, *JAOS*, LXI, 222): thus e.g. *YAJ* + *Tam* ÷ *iāṣṭam* → *iṣṭam*, *śVAn* + *ā* ÷ *śuāā* → *śunā*. By a rule of interpretation (*Paribhāṣ.* 11 cf. Thieme 113), Pāṇini's primary definition of *saṃprasāraṇa* could be considered as including this secondary process. In a majority of cases the following vowel is a short *A*, so that generally speaking the term in fact implies a process *YA*, *VA*, *RA* ÷ *i*, *u*, *ṛ*. But the following vowel may also be *Ā* (e. g. *VĀ* ÷ *ū*, *YĀ* ÷ *ī* : vi. 1.16, vi. 4.2, vi. 4.132) or *I* (*RI* ÷ *ṛ* : v. 2.55). Western writers have generally ignored these latter cases and used the term only to refer to the *i*, *u*, *ṛ* alternation or alternants of *YA*, *VA*, *RA*. This use has been further extended for MidIA (see K.R. Norman, "Samprasāraṇa in Middle Indo-Aryan", *JRAS*, 1958, 44ff.) to refer to those cases where historically *aya*, *ava* > *e*, *o*; this is by way of a deduction from the usage for Sanskrit, since the MidIA development has been envisaged (probably wrongly) as *a-ya*, *a-va* > *a-i*, *a-u* > *e*, *o*.

articulated then initially, though less weakly then finally[29] (cf. p. 38); it therefore seems probable that in the case of the junctions that we are considering we have an anticipation of the MidIA developments in the weakest, final position.[30] This would explain why the development only takes place in the case of *E*, *O* + *A* (< AY, AV + A) and not of *AI*, *AU* + *A* (< ĀY, ĀV + A), which might be expected to result in *-ai'-*, *-au'-* if it were simply a matter of "elision".

On this hypothesis, the writing with an apostrophe ("*avagraha*"), which is occasionally found in mss. and regularly in printed texts as a sign of "elision" is misleading;[31] for the earlier initial *a* has in fact contributed to the development of the *e* and *o*, and one might more appropriately write simply *tebruvan*, *viṣṇova*, etc. It may be mentioned that the ancient treatises are by no means unanimous in describing the process as one of "elision"[32] ("*lupyate*" etc.); Pāṇini, for example, treats it simply as a case of "a single sound taking the place of two" ("*ekādeśa*").[33]

It may also be significant that if the basic form of the first word has a high tone ("*udātta*") on the final *E* or *O*, and the initial of the

[29] Cf. the same distribution for Latin *m* as described by Priscian (Keil II, p. 29, l. 15f.).

[30] cf. J. Bloch, *L'Indo-Aryen*, 77. A similar view is reported for Whitney (*Proc. AOS*, May 1880) by C. Bartholomae, *Studien zur idg. Sprachgeschichte*, I, 85n., but is rejected by him on the grounds that the development does not occur medially (in Sanskrit) — but the delay in its operation here is readily explained by the lesser weakness of the semivowels in this position (for possible tendencies to *saṃprasāraṇa* medially even in Sanskrit see Wackernagel, I, § 48b).

[31] Cf. Bollensen, *ZDMG*, 22, 623ff; H. Bechert, *Münch. St. zur Sprachw.*, VI, 9. As a graphic device, however, it fulfils a certain function in avoiding possible ambiguities, notably between words with and without "privative" *A-*, which show identical sandhi in junction with preceding *-O* and *-E* (likewise *-Ā*) (and with *-AS*, if the non-privative form begins with a voiced consonant: cf. pp. 63ff., 71f.). Considerations of ambiguity also probably underlie the rulings of Pāṇini and of the Prātiśākhyas, that the *abhinihita* sandhi regularly takes place in Vedic before *y* or *v*; for, as suggested by Thieme (*OLZ*, 1934, 558), no ambiguity could there arise, since the "strong" articulation of truly initial *y* and *v* would distinguish them from medial *y* and *v* (after an "elided" *a*); cf. also *Variants*, § 896.

[32] cf. *Variants*, 419: "We shall use this familiar term, altho doubtless "absorption" would be more accurate."

[33] Cf. Thieme, 46ff.

second word is unaccented, the sandhi shows a circumflex (the so-called "*abhinihita-svarita*") and not an *udātta*. In such a junction the initial *A* must be considered as carrying the falling tone ("dependent *svarita*") automatic after a preceding *udātta:* e.g.

tÉ + *Àbruvan* ÷ *tèbruvan* (written *tèbruvan*).

Thus from the accentual point of view the process is in fact one of combination and not of loss of the second element.[34] Similarly the junction of an unaccented final and an *udātta* initial results in an *udātta* and not in an unaccented sandhi form. In neither case, of course, is it a matter (as Macdonell, *Ved. Gr.*, 104) of the accent of the *A* being "thrown back" or "ousting" the other; in Vedic, as in Greek, the combination of an acute and a grave results in a circumflex, and of a grave and an acute in an acute.

A further piece of prosodic evidence may be provided by the fact that if the initial *A* is *nasalized*, the nasality is maintained in sandhi; e.g. *tE* + *Aṃśāḥ* ÷ *teṃśāḥ*.

It seems probable that the "*abhinihita*" sandhi development of Ved. *-aya-*, *-ava-* > cl. *e*, *o* may in fact have been more or less direct (perhaps via some such stage as [ẽẽẽ], [õõõ], with mutual approximation of the vocalic and semivocalic elements), and not (as sometimes assumed for the MidIA development) via *-ai-*, *-au-*. The example of the address-forms *bhoḥ*, *bhagoḥ*, and *aghoḥ* is here instructive. Their development from *bhavaḥ* etc. shows the same process in *medial* position; and, like inflexional terminations, words of this category are, as Sir Ralph Turner has shown, particularly

[34] Cf. Bollensen, *loc. cit*; Whitney, *JAOS*, V, 200; Keith on *Ait. Ār.* iii.1.5 (p. 244, n. 3). The same accentuation is found where a final close vowel is reduced to a semivowel (as *vÍ* + *Ânat* ÷ *vyânat*). In cases of the combination of similar vowels, or the reduction of an initial close vowel (both termed "*praśliṣṭa*"), opinions vary; either *svarita* or *udātta* is permitted by Pāṇini (viii.2.6), and the *RP* (iii.14) attributes the prescription of the *svarita* to Māṇḍūkeya. Practice tends to favour the *udātta* in such cases, but this may well reflect (as Wackernagel, I, 292, after Benfey) the persistence of an earlier (? IE) accentual system, in which the *svarita* had not acquired the importance which it has in Vedic. The *kṣaipra* and *abhinihita* vowel sandhi, however, (which invariably show the *svarita* where the basic final is *udātta*) are both comparatively late, and so their tonal characteristics would be those of the contemporary language rather then of the earlier period fossilized in the *praśliṣṭa*.

liable to show anticipation of later general sound-changes.[35] But the external sandhi of e.g. *bhoḥ* (as in *bhOS* + *Naiṣadha* ÷ *bhonaiṣadha*) is not such as we should expect if the final had been preceded by a close vowel or (historical) diphthong (as e.g. *tayOS* + *Na* < tayAVS ÷ Na ÷ *tayorna*). The point is expressly noted by Pāṇini (viii. 3.17), who includes these words together with cases of *-ăS*, even to the extent of permitting a *y*-glide before an initial vowel (*bho(y)atra:* cf. viii. 3.19f.).

The existence of a diphthongal stage,[36] which should lead to e. g. *bhoratra* (cf. pp. 57ff.), is therefore unlikely; and if *bhoḥ* etc. are in fact cases of anticipatory sound-change, the same argument might then be extended to the anticipated MidIA developments, and to the Sanskrit *abhinihita* sandhi process.

The classical sandhi forms of the type *tebruvan*, *viṣṇova* are also found in Vedic mss., but here metrical evidence generally points to a disyllabic pronunciation. It is probable that the writing of *e*, *o* in such cases, as also when the initial *a* is maintained (p. 39), is due to the influence of the later Sanskrit forms, and that the true Vedic forms would in fact here too be *-a(y)a-*, *-a(v)a-*.[37] But the small residue of cases where the metre points to a monosyllabic pronunciation must presumably be taken to indicate that already in Vedic the MidIA *saṃprasāraṇa* process was beginning to operate — it is perhaps significant that such cases become more frequent in later parts of the *RV*.

This development does not apply to the junction of final *E* or *O* with initial *E* or *O*, in spite of the fact that the initial, like the final, is historically convertible to AY, AV, with consequent initial short A. Theoretically one might have expected e.g.

prabhO ÷ *Ehi* < prabhAV + AYhi ÷ prabhavayhi > (cl.) *prabhoyhi*.

[35] "Anticipation of normal sound-changes in Indo-Aryan", *TPS*, 1937, 1ff.

[36] As suggested by Wackernagel, I, § 48b.

[37] Cf. Oldenberg, 454; *Varianten*, §§ 891ff; Whitney on *AP* iii. 54; M. L. Rastogi, "Śaunaka and the *abhinihita* sandhi in the Ṛgveda", *IL, Bagchi Mem. Vol.*, 21ff. This would also explain why the mss. maintain final *e*, *o* only before *a* and not before other vowels; for only in this case is there a classical sandhi showing *e*, *o*.

But apart from tbe fact that diphthongs with other than open first members would be otherwise unparalleled in Sanskrit, such a development is likely to have been precluded by tbe monophthongization of preconsonantal ay, av preceding the operation of tbe *saṃprasāraṇa* process; in fact on a formulaic level the problem does not arise if we follow the practice here adopted (see p. 33), since preconsonantal ay, av are treated as pre-Sanskrit, and the reconstructed prabhavayhi etc. should therefore first be converted to (Ved.) *prabha(v)ehi* (as on p. 38, where for this reason it is considered irrelevant to convert the basic initial *E* to AY).

Tbe previous statements have assumed an interpretation of the pre-Sanskrit diphthongs as ay, av, āy, āv (basic AY, AV, ĀY, ĀV) corresponding to Sanskrit (preconsonantal) *e, o, ai, au* (basic *E, O, AI, AU*). But it is realized that there may be objections, general or specific, to a di-pbonemic interpretation of this kind.[38] If sucb objections were sustained, the above statements would require only minor modification; appropriate digraphs for unitary diphthongal pbonemes would then be ai, au, āi, āu (basic AI, AU, ĀI, ĀU). The preconsonantal derivations would be the same. But in prevocalic position it would be necessary to apply the process of "reduction" to tbe second element of the diphthong: e.g.

tE + Āgatāḥ < tAI + Āgatāḥ ÷ *ta(y)āgatāḥ.*

This would have to be specifically stated, since, by tbe monophonemic interpretation of the diphtbongs, the I or U of the digraph should not be automatically identified with the I or U representing a simple vowel. In the junction of an open and a close vowel, on the other hand, the process of reduction would be unnecessary: e.g.

tavA + Indra < tavA + Indra ÷ tavaindra > *tavendra:*

but when the basic initial is long, a process of shortening instead of reduction would be required: e.g.

atrA + Īśvaraḥ <atrA + Īśvaraḥ ÷ atraiśvaraḥ > *atreśvaraḥ.*

In junctions of the type *tavA + Eva* < tavA + AIva it would also have to be specifically stated that the final vowel combines witb tbe

[38] For some of the general problems cf. M. Swadesh & K. L. Pike, *Lg.*, XXIII, 137ff., 151f.; also W. P. Lehmann, *Proto-Indo-European phonology*, 10ff.

first element of the initial (÷ tavāiva > *tavaiva*) since, by tbe monophonemic interpretation, the A of the digraphs AI or AU should not be automatically identified with A representing a simple vowel — a digraph is not to be considered as the sum of its components.[39]

[39] Cf. J. R. Firth, *BSOS*, VIII, 543.

II

VOWEL + CONSONANT

This type of junction calls for comparatively little comment, since the sandhi forms are generally identical in structure with the basic sequences:

Ex: *sĀ + Devī ÷ sādevī*

This applies even to initial *Y* and *V*, which are here in the "strong" position; thus e. g.

kṛṇutA + Yajñam ÷ kṛṇutayajñam

Nor do final *E*, *O* and *AI*, *AU* present any problem; for although they would be historically convertible to AY, AV and ĀY, ĀV respectively, the corresponding ay, av and āy, āv in sandhi would in turn be reconvertible to *e*, *o* and *ai*, *au* in the position before a consonant. There is thus no descriptive necessity for making the conversions.

It is necessary, however, to consider a special class of exceptions. In the classical language the dual ending *-AU* appears with its expected sandhi alternants in all environments. But in Vedic prevocalic *-āv* is found in alternation with preconsonantal *-ā*. Such an alternation is not explicable on the basis of Sanskrit sandhi, Vedic or classical, and may represent the survival of a prehistoric alternation of "long diphthong" before vowel with long vowel before consonant.[1] The remarkable locative singular in *-AU* of *i*-stems is probably to be similarly, though more indirectly, explained. Here again in Vedic prevocalic *-āv* (and terminal *-au*) alternate with preconsonantal *-ā*.[2] For the *u*-stems a locative in *-AU* is understandable,[3] and the prehistoric alternation might there have given

[1] Cf. Wackernagel, III, § 18; Renou, §§ 121, 236.

[2] Cf. Wackernagel, III, § 76; Renou, § 272. On Vedic perf. *paprâ|paprāu* etc. also see now F. R. Adrados, *Hommages Niedermann (Latomus*, XXIII*)*, 17 ff.

[3] If one accepts the idea of an ending-less lengthened-grade form. In a recent paper to The Philological Society in London Prof. O. Szemerényi has suggested that the original ending of the *l*-stems in PIE may have alternated between **-eyl* before a consonant and **-eyy* before a vowel; the latter would have developed, by transfer of length, to IE **-ēy*, and this alternant would have been generalized; the same pattern would then have been transferred to the *u*-stems.

rise to **-āv ~ -ā* sandhi forms (though **-ā* is not in fact preserved for the *u*-stems); the expected corresponding locative for the *i*-stems would be *-AI*, with a prehistoric alternation **-āy ~ -ā*. The original identity of the *i*-stem and *u*-stem locatives in the preconsonantal position (**-ā*) could then have led analogically to an identity in other positions,[4] with **-āy* being replaced by **-āv*.[5] There still of course remain the problems, why the **-āv* form prevailed over the **-āy*, and why the **-ā* alternant of the *u*-stems does not survive.

The only common exception to the invariability of initials is provided by initial *CH*, the voiceless aspirated palatal stop [W. 227]. After a short final vowel the ancient authorities prescribe a gemination (÷ *cch*) in sandhi:

Ex: *nA + CHidyate ÷ nacchidyate*

This process has an historical basis; for Sanskrit *ch* is almost always derivable from IE **sḱ* or **sḱh* (cf. Skt. *chāya:* Gk. σκιά, Skt. *chid-:* Gk. σχίζω). It is thus descended from a group of two consonants, and medially in intervocalic position it is in fact regularly double,[6] as e.g. *gacchati* beside Gk. βάσκε (<IE **g^{w}ṃsḱ-*). In junctions of the present type the consonant is similarly in an intervocalic position (since the initial *CH* is always followed by a vowel) and so shows the double value in sandhi.

The fact that the double *cch* is regularly prescribed only after *short* final vowels has a clear explanation. The double consonant has the effect of ensuring that the preceding syllable retains its prehistoric value as a *heavy* syllable, in spite of the changes under-

[4] Note the replacement of *y* by *v* and vice-versa in Prakrit *kaṭavaṃ < katipayam*, Pali *āvuso < āyuṣmant-*, *migadāya < mṛgadāva-*, which doubtless reflects the common interchangeability of *y* and *v* in this position (see p. 61); similarly in ModIA, Sindhi *chāwa* < Skt. *chāyā* (cf. Marathi *sāvlī* and, within the Rajasthani group, Harauti *chāvḷī* beside Mewari *chāīlī*).

[5] In which case the analogy is Indo-Iranian (cf. *gara|garō* as loc.sing. of *gari-*).

[6] But for this reason commonly written single, since the indication of the double value is graphically redundant.

gone in Indo-Iranian by the consonant-group whereby its quantity had originally been determined. It exemplifies a not uncommon tendency for prosodic features to be preserved in spite of phonematic changes. But the double consonant was essential to the preservation of quantity only when the preceding vowel was short; for, as in Greek and Latin, a long vowel in itself ensured the heavy quantity of a syllable.

This is in fact a case where a historical feature is better preserved by other than the "basic" alternant. The descriptive need for a derivational process of "gemination" (as in *nA + CHidyate ÷ nacchidyate*) arises only from the choice of the more frequent alternant (*ch*), which is also the post-pausal alternant, as providing the basic initial (*CH*). The historical process has rather been one of simplification after long vowel or consonant.

The rule relating to the double *cch* is also extended to those cases where it is preceded by the prohibitive *mā* (not, however, in the *RV*) and the preposition *ā*, in spite of their long vowels. The junctions in these cases commonly involve a verb as second element; the combination is then virtually a single word[7] (having in Vedic only a single tonal accent), and the consonant might thus be considered as in *medial* intervocalic position; and since in this position single *ch* never occurs, even (according to the grammarians) after a long vowel,[8] the cases in question might be explained as conforming to this pattern.

[7] In classical Sanskrit prepositions qualifying a verb are inseparably prefixed to it (as also generally in subordinate and negative clauses in Vedic); and from earliest times combinations of prefix + verb display features of internal sandhi — thus initial *S ÷ ṣ* after final *I* or *U* [W. 185], initial *N ÷ ṇ* after preceding *R* [W. 192.] There are in fact only three prefixes with a final long vowel, viz. *ā, parā, acchā*; of these *ā* is by far the most frequent (W. 1077a), and in any case is the only one occurring with verbal roots having initial *ch*. *ā* has also an exceptionally close relation to the verb in that when a verb has two or more prefixes, *ā* practically never precedes the others (cf. Renou, § 381, "*Â* est considéré comme partie intégrante du verbe").

[8] In fact in the vast majority of cases internal intervocalic *cch* is preceded by a short vowel. Most if not all cases where a long vowel or diphthong precedes may be explained as the result of lexical innovation or of internal sandhi or derivation (e. g., *mleccha-; aicchat; aicchika-, pauccha-, kāccha-*).

A further peculiarity, of limited occurrence, concerns initial *S* in junction with a final close vowel. In Vedic, in addition to those cases where the preceding word is a verbal prefix (see note 7), the rule of internal sandhi whereby *S ÷ ṣ* [W. 180ff.] is sporadically applied elsewhere; but such cases generally involve enclitics or a pair of closely related words:[9]

Exx: *abhI + Santu ÷ abhiṣantu*
ṛchantI + Sma ÷ ṛchantiṣma
rajaḥsU + Sīdan ÷ rajaḥsuṣīdan[10]

It remains to mention certain features of Vedic sandhi which, though not entirely regular, may be seen to reflect different aspects of a general tendency that was probably more regularly operative at an earlier period. The first of these features is the lengthening of a basic final short vowel in the position before an initial consonant, as e.g.

śrudhI + Havam ÷ śrudhīhavam

Such lengthening is not uncommon, but it is almost exclusively confined to the position before a single consonant, and the tendency is particularly marked where a light syllable both precedes and follows. The same pattern is preserved in compounds such as *urūṇasaḥ* or *vṛṣākapiḥ*. It is evidently linked to considerations of sentence-rhythm, namely to a tendency to regulate the succession of light and heavy syllables, and in particular to avoid extended sequences of light syllables.[11] Lengthening before an initial consonant-group would of course be unnecessary, since the group

[9] In Renou's terms (§ 149) if the following word is "une forme verbale plus ou moins brève ou banale, une particule, un pronom monosyllabique".

[10] Similar considerations apply to *N*, initial or post-initial, when the preceding word contains a retroflex continuant under the conditions for internal "*nati*" ([W. 189ff.]; cf. Allen, *BSOAS*, XVI, 556ff.):
Exx: *paRi ÷ Naḥ ÷ pariṇaḥ; pRA + ENān ÷ praiṇān; agneṢ + AveNa ÷ agneraveṇa; śṛṅgavṛṢaS + Napāt ÷ śṛṅgavṛṣoṇapāt.*
The neutralization of the retroflexion processes in the vicinity of another retroflex continuant is also found as internally:
Exx: *paRI + Santi ÷ parisanti* (not *pariṣanti*); *paRI + NakṢati ÷ parinakṣati* (not *pariṇakṣati*).

[11] Cf. Renou, §§ 41ff., 108ff., and the material collated by S. M. Katre, "Studies in the rhythm of Old Indo-Aryan vocables", *Bull. Deccan Coll*, III, 181ff.).

would of itself ensure the heavy quantity of the preceding syllable.[12] Whilst this lengthening does in the Vedas serve metrical purposes, its survival in compounds suggests that it had an original basis in actual speech.[13]

Similar considerations apply to the case where a word begins, in its classical basic form, with a group comprising consonant + semivowel *Y* or *V*. Here the metrical evidence in Vedic points unmistakably to an alternation of the semivocalic form (as e.g. *tyaḥ*, *tvam*) after a final short vowel with the vocalic form (as *ti(y)aḥ tu(v)am*) after a heavy syllable — i.e. after a word ending in a long vowel or a consonant (as also at the beginning of a verse). This again is clearly a matter of rhythm; the "reduced" form of the initial sequence (*ty-*, *tv-* etc.) has the specific effect of ensuring the heavy quantity of the preceding final syllable, and would suggest that for Vedic the syllabic form might better be considered as basic (*TI-*, *TU-* etc.). This particular sandhi process is in fact but one aspect of what was probably a general feature of Indo-European ("Sievers' Law"),[14] whereby a prevocalic syllabic **i(i̯)*, *u(u̯)* after a heavy syllable alternated with a consonantal **i̯*, *u̯* after a light syllable (cf. *naptiyaḥ* ~ *satyaḥ*, or *śaknuvaḥ* ~ *sunvaḥ*). We have already seen (p. 35, n. 17) that the prepositions *pratI* and *anU*, both with light first syllables, are notable in Vedic sandhi for undergoing "reduction" of their final vowel before an initial vowel.

The process of vowel-lengthening (see above) may also have had an Indo-European origin, traces of which in internal sandhi are particularly noticeable in Greek.[15]

In this connexion it is of interest to revert to a feature of the sandhi of final and initial vowels. As mentioned above (p. 29),

[12] Certain cases of apparent shortening (notably at the end of a *pāda*), and of lengthening before a consonant-group, have been explained by F. B. J. Kuiper ("Shortening of final vowels in the Rigveda", *Med. Ned. Akad., Afd. Letterk., N. R.* XVIII, 11) as a reflex of the sandhi of an original final laryngeal preceded by a short vowel.

[13] For details see Wackernagel, II.1, § 56.

[14] *Beitr. z. Gesch. d. deutschen Spr. u. Lit.*, V, 129 f.

[15] As e. g. in the comparative σοφώτερος (with long ω after light syllable) as aginst κουφότερος (with short ο after heavy syllable).

the rule of "combination" in such cases is less rigidly applicable to Vedic than to tbe classical language; and amongst the common exceptions is the enclitic particle *-cA*. It is probably significant that when its combination with a following vowel does in fact take place, it is predominantly in cases where the following syllable is light.[16] Thus if the following syllable is heavy, the light syllable *ca* appears (with hiatus); but if the following syllable is also light, tbe two combine to form a heavy syllable. Evidence of this tendency is also preserved in compounds, where metrical considerations show that in Vedic there was often hiatus between the two members, but only wben the second member began with a heavy syllable — thus *yuktāśva-* to be read as *yuktaāśva-*.

In the classical language, however, the sandhi alternations are in general of a more limited, phonematic type, and the more extended, prosodic alternations here discussed survive only partially in fossilized internal positions.[17]

[16] Cf. Oldenberg, 441; Kuryłowicz, "Quelques problèmes métriques du RV", *Rocznik Orientalistyczny*, IV, 196ff.

[17] For a valuable discussion of the various processes "fossilized" in Greek (including syncope and gemination), which point to a similar original tendency, see F. de Saussure, "Une loi rythmique de la langue grecque", in *Mél. Graux*, 737ff. (= *Recueil*, 464ff.); also Wackernagel, *Das Dehnungsgesetz der griechischen Kompositа.*

III

CONSONANT + VOWEL

The inventory of basic final consonants is very limited, and largely corresponds to that of the terminal finals. But morpheme-finals within the word are by no means so restricted. The word-final position thus involves the neutralization in all environments of many oppositions which require to be recognized in morpheme-finals (e.g. of velar and palatal, voiced and voiceless, aspirate and non-aspirate, stop and (palatal) fricative) — in fact almost any consonant phoneme may appear amongst the latter. If we wished to give a single basic form for morphemes which occur sometimes as word-final and sometimes not (as in the case of verbal roots and nominal stems) we should, in order to avoid ambiguity, have to adopt basic forms appropriate to the more diverse internal sandhi forms. Thus e.g. terminal *dik*, *vāk*, *abhāk*, *dhak*, *adhāk* would have to be stated in some such basic form as *diŚ*, *vāC*, *abhāJ*, *daGH*, *adāH* respectively,[1] in view of the internal *diśah*, *vācaḥ*, *bhajati*, *daghat*, *dahati* etc. The neutralization in final position would then have to be explicitly stated.

From the standpoint of exclusively external sandhi, however, the neutralization may already be assumed, and the forms in question may therefore be indicated as *diK*, *vāK*, etc.

It is in fact an assumption throughout this study that the onus of seeking grammatical congruence will be placed upon *internal* sandhi, though *ceteris paribus* (e.g. if the derivations are not thereby complicated) grammatical congruence is taken into account in deciding between alternative basic forms as starting-points for the external sandhi processes. This is an arbitrary assumption, and

[1] We here ignore the fact that if overall congruence of this type were sought, the forms in question might rather appear more fully as *diŚ-S*, *vāC-S*, *abhāJ-S-T*, etc.

it is realized that the additional internal complications involved may exceed the external saving; but some working assumption of this kind is necessary if we are not to prejudge questions of the "demarcation of responsibility" which must await a full treatment of internal sandhi.

(a) *Final oral stop* [W. 159]

The main principle here is tbat, since the initial is inherently voiced, so also is the preceding final, whatever its historical original or internal basic form. The terminal finals are regularly represented as voiceless (*k*, *ṭ*, *t*, *p*: see however p. 97), and this practice is followed for the basic forms. A derivational process of voicing is therefore necessary:

Exx: *abhūT + Ayam ÷ abhūdayam*
tādṛK + Annam ÷ tādṛgannam
ṣaṬ + Aśītayaḥ ÷ ṣaḍaśītayaḥ
triṣṭuP + Api ÷ triṣṭubapi

It may be noted that no such process of intervocalic voicing is involved in internal sandhi (though normal in compounds) — thus e. g. *paT + Ati ÷ patati.*[2] It is only the "weak", word-final position that is affected; but, as with the assumed "*saṃprasāraṇa*" process (see p. 40), we have here an anticipation of a more general internal development in MidIA.[3]

A further process, peculiar to Vedic, concerns only the retroflex final; in some recensions of the *RV* an expected *ḍ* is replaced by *ḷ* (as also in medial intervocalic position), e.g.

ṣaṬ + Ūrvīḥ ÷ ṣaḷūrvīḥ

[2] In fact in internal sandhi the voicing process typically takes effect only before *distinctively* voiced consonants, i.e. voiced stops (which alone have voiceless counterparts) and not before semivowels, nasals or vowels.

[3] For dialects attesting this change see Pischel, *Gr. d. Prakrit-Sprachen*, §§ 192, 198, 202–3; elsewhere voicing was also doubtless an intermediate stage in their complete loss or replacement by *ẏ* (cf. *loka-* > Pkt. *loga-*, *loẏa-*, *loa-*), and is further attested in "*semi-tatsamas*" (early loans from Skt.) as e.g. Hindi *log*.

This sound was doubtless a retroflex lateral flap, sucb as is found in some ModIA languages (e.g. Gujarati, Rajasthani) replacing a single intervocalic *l*, as a retroflex nasalized flap replaces a single intervocalic *n;* the replacement of an intervocalic retroflex voiced stop by a retroflex flap is found e.g. in Hindi (but witbout lateralization). The Vedic development was doubtless a dialectal anticipation of the more general identical process in MidIA;[4] it is unknown in the classical language, and is one exemplification of the fact that "the horizontal classification of the Indo-Aryan languages based on the relative dates of their literatures... is anything but rigorously scientific".[5]

It will have been seen that a junction of the type *saT + Eva* involves the same sandbi sequences (*sadeva* etc.) as those of the type *sA + Devaḥ ÷ sadevaḥ* etc. This, however, does not necessarily mean that the relevant articulations were identical; it is possible tbat the *d*, for example, may have differed in these two cases (e.g. in respect of duration or muscular tension), and that a distinction may thus have been preserved (as in e.g. English "a name" "an aim"). But we have no evidence of any such details.[6]

(b) *Final nasal* [W. 158]

The terminal as also the basic nasal finals are practically confined to the labial *m*, the dental *n*, and the velar *ṅ*.[7] Since nasals in Sanskrit are invariably voiced, the junction and sandhi sequences are similar:

Exx: *ahaM + Asmi ÷ ahamasmi*
tāN + Uvāca ÷ tānuvāca
prāṄ + Āste ÷ prāṅāste

A special process is applicable, however, when a final *N* or *Ṅ* is

[4] Cf. Pischel, *op. cit.*, § 240.
[5] Edgerton, "Dialectic phonetics in the Veda", *Studies ... Collitz*, 25.
[6] cf. *PAI*, 9f. and refs; Bloch & Trager, *Outline of linguistic analysis*, 35f, 47.
[7] On *n* see Wackernagel, I, 188, 191; Whitney, § 194; Renou, § 101.

preceded by a short vowel, in which case the sandhi forms show a double nasal [W. 210] :

Exx: *abharaN + Iha ÷ abharanniha*
pratyaṄ + Asi ÷ pratyaññasi

The explanation is similar to that of the double *cch* discussed in the previous chapter. In a majority of cases the terminal *n* or *ṅ* results from the simplification of an original consonant-group. For *n* this is notably the case in the 3 pl. pret. act. (as e.g. *abharan* above), and the nom. si. masc. of the pres. part. act.,[8] as e.g.

vājayaN + Iha ÷ vājayanniha

The former derives ultimately from an IE ending in **-nt* (compare Latin *erant* with Sanskrit *āsan*), and the latter from an ending in **-nts* (compare Latin *ferens* with Sanskrit *bharan*, and note e.g. the acc. *ferentem, bharantam*). Similar considerations apply to the 2 and 3 si. pret. act. endings of athematic stems in *-n-*, *-nd-* or *-m-;* thus e.g.

ahaN + Ahim ÷ ahannahim,

where *ahaN* < IE **e-g^{w}hen-s* or *e-g^{w}hen-t*; also to the voc. si. masc. of the pres. part. act. (e.g. terminal *bhavan* < IE * *bheu̯-ont*) and of stems in *-ṃs-* (thus (classical) comparative *garīyan*, perf. part. act. *vidvan*, and *puman* — all < IE * *-ns*).

The terminal forms ending in *ṅ* are all nom. or voc. si. masc. of stems in *-ñc-*, and so historically derivable from an original **-nk(s)*.

Thus the descriptive process of "geminatiοn" after a short vowel represents historically a preservation of the originally heavy quantity of the preceding syllable. The fact that the groups are not preserved in their original form (as e.g. *nd, ṅg* before following initial vowel) is presumably attributable to the influence of the terminal alternants with *n* and *ṅ*, which regularly show loss of all but the first consonant of an original final group.[9]

[8] And a few other words having stems of similar form, e. g. *bṛhan*.
[9] With the rare exception of final *r* + stop, generally when the whole group belongs to the same morpheme (cf. Wackernagel, I, § 261; Renou, § 103; Whitney, § 150). This might be viewed as a further indication of the phonological equipollence of *r* to the y or v forming the second element of a diphthong (see pp. 32ff.); thus the final group of e. g. *āvart* (root *vṛt-*) is comparable with that of abhayt > *abhet* (root *bhid-*) or amavk > *amok* (root *muc-*).

The pattern of junction thus established, which covered the vast majority of cases with pausal final *n* (and all with *ṅ*) after a short vowel, was eventually extended even to those cases where there never had been a consonant-group — as the voc. and (Ved.) loc. si. of nominal stems in *-n-*, and the pronominal loc. si. in *-smin*, e.g. (terminal) voc. *rājan*, *ātman*, loc. *adhvan*, *tasmin*. But the metrical evidence in Vedic suggests that, although *nn* is written in sandhi after a short vowel, the geminate was still generally confined to those cases where it was historically justified. It is further possible that the process of gemination was original only in the case of historical **nt(s)*, and that a Vedic sandhi form such as (2 si.) *ahannahim* already represents an extension of the process under the influence of the more common 3 si.[10]

For Vedic therefore one might be justified in establishing for the geminate sandhi forms a basic final other than simple *N*, since this would be ambiguous in regard to the sandhi alternations. The simplest derivations would be provided by *NN*, e.g.

abharaNN + Iha ÷ abharanniha,

in spite of its historical unreality. Considerations of internal grammatical congruence could lead to a statement of such forms as ending in *-NT* (cf. mid. *abharanta*, acc. *vājayantam*, etc.), which might in turn provide the basic final for external sandhi, though this would require more complex statement: e. g.

abharaNT + Iha ÷ abharandiha → abharanniha.

In classical Sanskrit no such distinction is required, since gemination is automatic after a short vowel; but in this case we should, strictly speaking, include the shortness or length of the preceding vowel amongst the relevant basic elements, with appropriate typography: e.g.

tasmIN (→ tasmiNN) + Api ÷ tasminnapi
tĀN (→ tāN) + Uvāca ÷ tānuvāca.

(A further special feature of the Vedic sandhi of final *N* is reserved for discussion on p. 65).

[10] Thus Oldenberg, 429f. (otherwise J. Bloch, *MSL*, 23, 178); cf. also R. Gauthiot, *La fin de mot en indo-européen*, 148ff.

It has been suggested [11] that a similar phenomenon may lie behind the invariably heavy quantity of a prevocalic Vedic *-ar* in cases where the *r* derives from **-rt* (as *kar*, *āvar*, *abibhar*), on the assumption that *-ar* here in fact represents an earlier *-arr* (and ? perhaps stands for *-ār*).[12]

(c) *Final ḥ* ("*visarjanīya*") [W. 164ff.]

The terminal forms with final *ḥ* (a voiceless breathing) are traditionally treated as basic; in this case, however, the terminal forms are ambiguous in regard to their alternants, and consequently do not provide appropriate basic forms. Thus e.g. terminal *-aḥ* alternates with *ar* or with *o* before a voiced initial consonant.

For one such set of alternations [W. 178f.] the basic final is statable as *R*, where *r* in fact prevails in a number of contexts.[13] Since *r* is invariably voiced in Sanskrit, we may expect it to appear before a following initial vowel. Thus e.g.

(punaḥ)punaR + Eti ÷ punareti

But in the case of the other set of alternations the problem is very much more complex. For there the basic final is statable as *S*, in spite of the fact that *s* is limited to a very small class of environments.[14] It may be mentioned that in the case of both *R* and *S* the basic final reflects the historically earliest alternant.

A discussion of the *S*-alternations may most simply begin with those cases where the final is preceded by a close vocalic articulation, viz. short or long *i* or *u* (also *ṝ*), the diphthongs *ai* and *au*, and the historically diphthongal *e* and *o* [W. 174].

There is a rule of internal word-phonology [W. 180ff.] that when *S* is preceded by a close articulation of this type it is subject to a process of retroflexion; thus the loc. pl. ending *-Su* combined with the stem *agnI* gives the form *agniṣu*. This process, operative both

[11] Oldenberg, 424, n.
[12] See also p. 74, n.15.
[13] Viz. before any voiced initial other than *r*.
[14] Viz., in classical Sanskrit, only before an initial voiceless dental stop.

within morpheme boundaries (as e.g. *snuṣā* < IE **snusā*)[15] and across them (as in the above internal sandhi)[16] is also applicable to word-final *S*, subject to the otber processes of external sandhi. Thus in the case of the word whose terminal form is *agniḥ*, the starting-point for the external derivational processes is *agniṢ* (in consequence of the internal sandhi of *agnI* + *S*) rather than *agniS*.[17]

Since the conversion to *Ṣ* bas in any case to be carried out internally, and since the external sandhi of *S* and *Ṣ* show considerable differences, it is most economical to treat them as separate finals, in spite of their automatic alternation.[18] Otherwise we should bave in each case to include an operation taking account of their different preceding vowels, which would merely duplicate the internal process (as e.g. *agnIS* → *agniṢ*, and strictly speaking even *aśvAS* → *aśvaS*).

Before an initial vowel the usual process of voicing is applicable, so that e.g. *agniṢ* + *Iva* might theoretically be expected to give a sandhi form such as *agniẓiva*, witb a voiced retroflex fricative *ẓ*. This result, however, is not attested. In Indo-Aryan, unlike Iranian, all voiced friction was eliminated at an early period; but tbe elimination of friction from a retroflex fricative still left the retroflexion in a frictionless form. As such it was sufficiently similar to be identified, if not actually identical, with the retroflex semivowel *r*,

[15] On the possible causes cf. Allen, *BSOAS*, XIII, 941, n. 3; xvi, 562ff.

[16] For its occasional application in external sandhi see p. 49.

[17] There are a few cases where a (radical) final *-S* appears to have a terminal alternant *ṭ* and not *ḥ*, viz. *dviṭ*, *vipruṭ*, *ṣaṭ* (cf. *dviṣaḥ*, *vipruṣaḥ*, *ṣaṣṭha-*). Historically the terminal finals in these cases derive from a group **-ṣs*, whence, with occlusion of the first element and regular simplification, *-ṭ* (though possibly by transfer from *dviḍbhiḥ* etc.); a similar history lies behind e.g. terminal *rāṭ*, *viṭ*, *avāṭ* (beside *rājaḥ*, *viśaḥ*, *vahati*): cf. Kurylowicz, *Esquisses Linguistiques*, 129f; T. Burrow, *JAOS*, LXXIX, 87. But for purposes of external sandhi the basic final in such cases is simply statable as Ṭ. Similarly for terminal *dadhṛk* (beside *dadhṛṣaḥ*) the basic final is statable as *K*; and for the grammatically prescribed terminal *dhvat* (stem *dhvas-*) etc. (cf. P. viii.2.72) one would establish a basic final *T*.

[18] In terms of strict phonemic theory they could not be considered as allophonic variants, since in non-final position there are cases of parallel distribution (e.g. *bhāsate: bhāṣate; vaste: vaṣṭi*).

by whicb it is accordingly represented. Thus *agniẓiva* → *agniriva*, wbich is the attested Sanskrit form. Other examples of this process are:

tanūṢ + Apsu ÷ tanūẓapsu → tanūrapsu
agneṢ + Api ÷ agneẓapi → agnerapi
gauṢ + Asti ÷ gauẓasti → gaurasti

Tbus tbe prevocalic alternant of final *Ṣ* is the same as that of final *R*, viz. *r*, and their identity in fact extends to their alternants in all positions. Tbeoretically, therefore, we could combine our *R* and *Ṣ* into a single basic final, which we might symbolize as *Σ*. Since however there is no similar actual consonant (as there are e.g. *r* and *ṣ*), its classification as voiced or voiceless would be arbitrary; before vowels it would of course be represented by the voiced alternant *r*:

Exx: *punaΣ + Eti ÷ punareti*
agniΣ + Iva ÷ agniriva

Our reason for accepting the traditional separation of final *R* and *Ṣ*, rather than establishing a hypothetical *Σ*, are based on considerations of congruence whicb are not strictly relevant to external sandhi as such. There are clearly certain advantages in using the related symbols *S* and *Ṣ*, since the alternative would have practically inconvenient internal grammatical consequences — e.g. the nom. si. of *rudra-* appearing as *rudraS* but that of *agni-* as *agniΣ;* and whereas *S* and *Ṣ* can be considered as automatic internal variants in final position, this would not apply to *S* and *Σ*, since *Σ* could also appear after an open vowel, as in *punaΣ* (our *punaR*); so that the *S* ~ *Σ* alternation would have to be restricted to particular grammatical categories. There would also be occasional instances where forms whicb had identical external alternants (as e.g. *pūΣ*, *dyauΣ*) showed differences in compounds (as *pūrpatiḥ*, *dyauṣpitā*).

One advantage that might be claimed for the establishment of *Σ* is tbat it would remove the need for making a decision as between *R* and *Ṣ* in doubtful cases, i.e. where a close articulation precedes and tbere is no pressing descriptive criterion for considering tbe final as one or the otber.[19] Where an open vowel precedes, con-

[19] Cf. Wackernagel, I, § 284 (a), note; Whitney, § 169b.

siderations of internal phonology exclude *Ṣ* (as *punaR*); and in other cases grammatical congruence may indicate *Ṣ* (as nom. si. *agniṢ*, permitting an easy internal sandhi of *agnI* + *S*, and thereby establishing it as parallel to nom. si. *rudrA* + *S* ÷ *rudraS*) or *R* (as nom. si. *pūR*, after gen. *puraḥ*).

Pāṇini adopts the device of taking *r* as the basic final corresponding to our *R*, and a modified form of this ("*ru*", cf. viii. 2.66) corresponding to our *S* and *Ṣ* (which are where necessary distinguished for sandhi purposes in terms of open or close preceding vowel). The sandhi statements applicable to *r* apply also to *ru*, except where special statements are made for the latter.

More problematic are the cases presented by the terminal ending *-uḥ* in active verbal inflexion (2,3 du. and 3 pl. perf. ind.; 3 pl. athem. aor; 3 pl. opt.). These may simply reflect an original final **ɾ̥*/*r* (cf. Av. *-ar*[ə]), supporting a basic *R*, but could also be < **-ɾ̥s* (cf. Av. *-ər*[ə]*š*); and a problem certainly arises in the case of the gen. si. of *ɾ̥*-stems, as e.g. *pituḥ*;[20] these forms almost certainly derive historically from **-ɾ̥s*, and grammatical congruence would support a statement of the internal junction as *pitɾ̥R* + *S*. But the difficulty is then to decide how the intermediate processes, historical or otherwise, are to be envisaged — e.g. whether as ÷ pitɾ̥Ṣ > *pituṢ* (with a change of ɾ̥ > *u* spreading from the environment before a voiced initial, where *Ṣ* ÷ ẓ → *r* and thus leads to a dissimilation of the preceding ɾ̥), in which case the external final is *Ṣ*; or whether as ÷ pitɾ̥Ṣ > piturṢ (with a special development of ɾ̥), whence, by simplification of final group, *pituR*, with external final *R*.[21]

It can hardly be said that the advantages of a unitary *Σ* are comparable with those of a separate *Ṣ* and *R*, but it should be remembered that the latter treatment is not strictly justifiable on exclusively *descriptive*, *external* sandhi grounds.

We may now consider the case of final *S*, occurring after an open vowel [W. 175ff.]. It is simplest to deal first with environments

[20] And the analogical forms *patyuḥ*, *śakhyuḥ*, *janyuḥ*.

[21] See on these problems A. Meillet, "La finale *-uḥ* de skr. *pituḥ*, *viduḥ*, etc.", *Mél. Lévi*, 17ff. V. Pisani, *RSO*, XIII, 362ff; Adrados, *Latomus*, XXIII, 26.

other than those where a final *aS* is followed by an initial *A* (i.e. with short open vowel both preceding and following). There is here no internal process of retroflexion, and we might therefore expect the first stage of the sandhi to be e.g.

devaS + *Āgataḥ* ÷ *devazāgataḥ*

But in this case the typical elimination of voiced friction would leave no distinctive articulation, since *z*, as the "unmarked" counterpart of *ẓ*, has no such characteristic as the retroflexion of the latter. The consonantal element is thus entirely lost, and the vowels on either side might be expected to display hiatus. This outcome was however avoided, as the ancient treatises tell us, by the insertion of a semivocalic glide.[22] Such glides, of either [y] or [w] quality, occur in similar functions in various languages,[23] including the modern Indo-Aryan group. Thus in Hindi, where a consonantal verb-stem such as *bhāG-* shows a preterite *bhāgā* and a subjunctive *bhāge*, a vowel-stem such as *khĀ-* shows a preterite *khāyā* and a subjunctive *khāve* (or *khāe*).[24] Historically also there was a tendency in MidIA for the Sanskrit intervocalic stops to be lost, and for the hiatus to be bridged by a lightly articulated *y*-glide ("*yaśruti*"), which is however indicated only in Jaina mss. (where it is transcribed as *ẏ*).[25] In some cases and dialects a *v*-glide is found instead, notably replacing labials (regularly) or velars (occasionally) — cf. *stokaka-* > *thovaẏa-*, with both treatments.[26] This option, though specifically mentioned by Kramadīśvara,[27] is in fact rare in Prakrit, but finds further evidence in some ModIA developments; thus Skt. *kātara-* > Hindi *kāyar* but Marathi *kāvarā*.[28]

[22] Cf. *PAI*, 67f.

[23] See especially J. R. Firth, "Sounds and prosodies", *TPS*, 1948, 45.

[24] The possible historical motivations of these forms are here ignored.

[25] R. L. Turner, *BSOS*, VIII, 206, quotes a striking parallel for intervocalic *–s– > –z– > –y–* from Gilgiti Shina (e.g. *sāẏārę* < *svasāraḥ*, beside Kohistani *sazare*).

[26] Cf. Pischel, *op. cit.*, §§ 231, 254.

[27] G. Grierson, *On the modern Indo-Aryan vernaculars*, § 362.

[28] *v* is in fact more common than *y* in this function in Marathi: cf. J. Bloch, *La formation de la langue marathe*, 71f. Note also in Avestan e.g. *duye*, *stuye* for expected *duve*, *stuve* (cf. H. W. Bailey, *JRAS*, 1939, 117; G. Morgenstierne, *NTS*, XII, 59).

It may be that in pre-Sanskrit the choice between *y* and *v* glides was originally determined hy the quality of the following initial vowel; hut by the time of our earliest evidence it was *y* that had been generalized in this particular function. Thus in fact

devazāgataḥ → (Ved.) *devayāgataḥ*

But as in the case of final AY, ĀY (see p. 38f.), the weakness of *y* in this position has the consequence that it is regularly omitted in the main scribal tradition, even in Vedic, and there is no evidence for its existence in the classical language. Thus

deva(y)āgataḥ > (cl.) *devāgataḥ*

That the apparent hiatus had in at least some cases a phonetic basis is shown, as in the case of -AY, -ĀY, by occasional resolution, as e.g.

adhaS + Āsana ÷ adhazā° → adhayā° > adhaā° > adhāsana

Both the non-indication of the *y*-glide and the resolution of the hiatus may be paralleled from Mid and ModIA. The indication of *ẏ*, is, as already mentioned, a peculiarity of Jaina mss., and its loss is proved hy such ModIA developments as the following:[29]

Skt. *carmakāraḥ* > Pkt. *camma(ẏ)āro* > Hindi *camār*

Skt. *rājā* > Pkt. *rā(ẏ)ā* > Apabhraṃśa *rāā* > Old W. Rajasthani *rā* (but Guj. *rāy*, *rāv*)

Skt. *ajagaraḥ* > Marathi *ār* (with resolution of douhle hiatus)

Note also Skt. *nagaram* > (in place-names) *-nār* (heside *-ner*: see p. 63).

Further examples of the sandhi development in Sanskrit:

ādityaS + Iva ÷ ādityaziva → ādityayiva > ādityaïva

aśvāS + Amī ÷ aśvāzamī → aśvāyamī > aśvāāmī

Similarly *bṛhadaśvaS + Uvāca ÷ bṛhadaśvaiiuvāca; aśvaS + Eti ÷ aśvaēti; āgatāS + Ṛṣayaḥ ÷ āgatāṛṣayaḥ*, etc.

The junction of final *-aS* with initial *A-* has heen deferred for the same reason, and follows much the same lines, as that of final *E* or *O* with an initial *A*. The expected derivation would he e.g.

[29] Cf. Grierson, *op. cit.*, § 177, and "On the phonology of the modern Indo-Aryan vernaculars", *ZDMG*, IL, 393ff. L, lf. Bloch, *loc. cit*; R. L. Turner, "Gujarati phonology" (*JRAS*, 1921), 340.

ataS + Aham ÷ atazaham → ata(y)aham

Such forms are indeed sporadically found in some Vedic texts, but for the classical language the attested sandhi form is in fact *atoham*, and Vedic shows generally either *-o-* or, more commonly, *-oä-* (with the first syllable requiring light scansion: cf. pp. 39f.).

We have seen that with the loss of intervocalic *z* the hiatus was bridged in other cases by a semivocalic *y*-glide, but that from a general phonetic point of view a *v*-glide would be equally possible. If we were to assume the latter for the present case, we should arrive at a form *atavaham;*[30] and the sequence *-ava-*, as in the case of *-O + A-*, may be expected to undergo the process of "*saṃprasāraṇa*" > *-o-*, whence *atoham.* If on the other hand a *y*-glide had heen introduced as in other intervocalic environments (and it is difficult to see why it should not), we should expect a sandhi form with *e* rather than *o*, viz. *ateham.* This, however, is nowhere found.

Either development would find a parallel in ModIA, in those cases where *-e-* or *-o-* result from a MidIA *-aẏa-* or *-ava-* in which the *ẏ* or *v* replaces a Sanskrit intervocalic stop;[31] e.g.

Skt. *kadalī* > Pkt. *ka(ẏ)alī* > Marathi *keḷ*

Skt. *karapattram* > Pkt. *karapattaṃ* (>*karavattaṃ*) > Hindi *karot*

The occurrence of *o* in this case may well be due to the analogical influence of other junctions. Where final *-aS* was followed by any initial voiced *consonant*, the sandhi form was at a very early stage generalized as -av > *-o* (as *nalaS + Nāma ÷ nalonāma*) — though with fossilized remnants of a development -ay > *-e* (see p. 71). In this environment the sandhi form of *-aS* was consequently the same as that of *-O* (cf. p. 46).

If now we adopt the symhols c^x to stand for any consonant, and d^x to stand for any voiced consonant, we may state the following formulae for the sandhi of (1) *-E*, (2)*-O*, and (3) *-aS*, in the environments

[30] As in fact P. vi.1.113.

[31] May a variation *y* ~ *v* underlie the peculiarity of Skt. *badaram* > e.g. Hindi, Panjabi *ber* but Gujarati, Marathi *bor* (Marwari *ḅorrī, ḅorti*)? cf. Turner, *Nepali Dict.*, s. v. *bayar;* Bloch, *Marathe*, 72.

(a) before an initial voiced consonant, and

(b) before an initial *A* (including the theoretically expected classical sandhi of final *aS* in this environment):

	(a)	(b)
(1)	$E + D^x \div ed^x$	$E + Ac^x \div ec^x$
(2)	$O + D^x \div od^x$	$O + Ac^x \div oc^x$
(3)	$aS + D^x \div od^x$	$(aS + Ac^x \div ec^x)$

These are conditions in which the relations between (1a) and (1b), and between (2a) and (2b,) might well exert an analogical influence over the relation between (3a) and (3b). Compared with the invariability of the vowel in (1) and (2), the alternation (3a)$od^x \sim$ (3b)ec^x would be anomalous, and one might assume a levelling in favour of (3a): thus in an analogical proportion formula

(1a)ed^x:(1b)ec^x: :(2a)od^x:(2b)oc^x: :(3a)od^x: (3b) $ec^x > oc^x$

The pattern of (3) thereby becomes identical with that of (2) so far as concerns the environments before initial *A* and voiced consonants. The analogy would be the more powerful in that, as a result of the *saṃprasāraṇa* process, the general structures of the sandhi forms in (a) and (b) are identical, with a long mid vowel followed by a consonant in each case.

This explanation seems preferable to that of Oldenberg,[32] who suggests that $aS + A \div$ a'a, with an intervening glottal stop, and that it was some (undefined) quality of this which induced the *o*-quality.

Here again, as in the case of $E + A$ and $O + A$, the common writing of the sandhi form with an apostrophe (as *ato'ham*) is misleading. It should also be mentioned that in Vedic, again as with $E + A$ and $O + A$, the metre almost invariably requires a disyllabic value, and here the writing with *o* (with or without "elision" of the initial *a*) must be considered as due to the influence of the later language; the Vedic form was in all probability *-aya-*.[33] A problem however arises when the metre in fact indicates a monosyllabic value for Vedic; the *saṃprasāraṇa* process applied to *aya* would result in *e*, but in no case is other than *o* written. We may either assume, without any direct evidence, that the original form in such cases was *e*, and that all such occurrences have been "normalized" to *o* under the influence of the later language; or that even in Vedic, in those instances where the *saṃprasāraṇa* process had already begun to operate,[34] the analogy suggested above had also taken effect.

[32] M. Bloomfield's explanation (cf. p. 40, n. 26) is equally fantastic in the present case.

[33] Cf. Oldenberg, 454ff.

We have deferred until this point the consideration of a type of Vedic sandhi involving the alternants of terminal *-n* when preceded by a long vowel. In practically all such cases the terminal final represents historically the simplification of an original final group **ns(t);* and in some cases internal grammatical congruence would support the recognition of corresponding basic forms. The categories involved are: acc. pl. of masc. vowel-stems (as *devān, raśmīn, śatrūn;* cf. Latin *equōs, hostīs, gradūs*); certain masc. nom. si. forms (as compar. *garīyān*, perf. part. act. *vidvān; pumān* — all having stem alternants in *-ṃs-*); 3si. act. *s*-aor. of roots ending in a nasal (as *atān* < **-nst, ayān* < **-nst* < ** -mst*).

By a regular process of internal phonology a basic *N* (or original **n*) is represented by a simple nasalization of the preceding vowel (indicated by "*anusvāra*", *ṃ*)[35] in the position before a fricative: thus e.g. *haN + Si ÷ haṃsi, *ĝhans- > haṃsaḥ*. In word-final, terminal position this process would not be effective, since at an early period the group was there simplified, with consequent single final *n* (but — cf. p. 87. — the fricative was preserved in certain types of preconsonantal sandhi even in classical times, and indeed analogically extended).

In the prevocalic environment in the classical language the terminal type of sandhi (with final *n*) has prevailed, whereas in Vedic a residual effect of the fricative is still preserved [W. 209] in practically all cases in the categories here considered. Since, however, this effect is not a feature of all forms which have a terminal *n*, we must set up two distinct basic finals for Vedic, since *N* would be

[34] Cf. Wackernagel, I, § 48b.

[35] See however p. 81 n. 31.

ambiguous. For the special categories the most appropriate formula is *NS*, quite regardless of historical or internal grammatical considerations, and in spite of the fact that an alternant *ns* nowhere occurs as such;[36] its validity is not restricted to the prevocalic position, but will be found equally applicable to Vedic preconsonantal sandhi.

The forms in question will then in fact be examples of basic final *S* and not *N*. And as in the case of *S* immediately preceded by a vowel, we may best begin by considering those cases where the vowel preceding the *NS* is a long close vowel (including *ṝ*). Since the processes of internal phonology require the reduction of the nasal before a fricative to *ṃ*, the *S* will in effect be preceded by a nasalized close vowel; and by the further internal process mentioned on pp. 57f. this will involve the retroflexion of the *S* to *Ṣ*[37] — which, as in the case of e.g. *agniṢ*, provides the actual starting-point for this type of external sandhi. We cannot, however, in this case treat the *basic* form as e. g. *raśmīṃṢ* rather than *raśmīNS*, since the nasal consonant requires to be maintained for the terminal form (and possibly elsewhere: cf. p. 89). The relevant derivational processes have therefore first to be operated; thereafter the same results may be expected as for final *Ṣ* preceded by a non-nasal vowel, with voicing, loss of voiced friction, and replacement of *ṛ* by *r:*

Exx: *raśmīNS → raśmĪṃS → raśmīṃṢ + Iva ÷ raśmīṃziva → raśmīṃriva; abhīśūNS → abhīśŪṃS → abhīśūṃṢ + Iva ÷ abhīśūṃziva → abhīśūṃriva; nṝNS → nṜṃS → nṝṃṢ + Abhi ÷ nṝṃzabhi → nṝṃrabhi*

The expected forms are those actually attested for Vedic.[38]

The processes involved when *-NS* is preceded by *ā* are also parallel to those of simple final *S*. There is the same absence of the internal process of retroflexion, and the same complete loss of the voiced fricative. To bridge the resultant hiatus one at least of the ancient authorities prescribes the same insertion of a *y*-glide[39] — though this is nowhere indicated in the texts: it may be that there was in fact less inducement to bridge the hiatus where there was a transition from a nasalized final to a non-nasalized initial:[40]

Exx: *devāNS → devāṃS + Iha ÷ devāṃziha → devāṃ'ha*
vidvāNS →[41] *vidvāṃS + Agne ÷ vidvāṃzagne → vidvāṃägne*
ayāNS →[41] *ayāṃS + Aviṣyām ÷ ayāṃzaviṣyām → ayāṃ-āviṣyām*

The fact that this type of Vedic sandhi applies only where the preceding vowel is long has a clear historical explanation. For a terminal final *n* preceded by a short vowel generally results either from an original simple **n* or from an original group **nt*(*s*), and not **ns*(*t*). Thus the sandhi here discussed does not apply e.g. in the case of the loc. *-smin*, or verbal forms in *-an*, or in the nom. si. of the pres. part. act. (on the sandhi of these forms see p. 55); and it is significant that in the one category where a terminal final *n* preceded by a long vowel results from an original **nt*, viz. in the 3pl. conj., the special Vedic sandhi does not apply — i. e. the basic final there is to be treated as *N* and not as *NS:* thus *gacchāN + It ÷ gacchānit*.

One might nevertheless have expected this sandhi to apply in Vedic to a 2si. verbal form such as (terminal) *ahan* < IE **eg*[w]*hens*, in spite of its short vowel; but, as already suggested (p. 56), this

[36] It would not even be possible (as in the case of *S* and *Ṣ*) to treat *N* and *NS* as internal variants of a single basic final, after short and long vowels respectively, since there are two classes of exception to this distribution (see pp. 67f.).

[37] For the retroflex effect of a nasalized close vowel cf. e.g. neut. pl. *havīṃṣi* beside *manāṃsi*.

[38] *nṝṃrabhi* is in fact an isolated instance; the terminal form *-ṝn* is normal in such cases, since *-ṝṃr* involves an avoided succession of two *r*-sounds (the first, however, being vocalic and nasalized).

[39] Cf. *PAI*, 68.

[40] Note the nasalization in Vedic texts of a final *a*/*ā* in hiatus — presumably, as Wackernagel suggests, "um den Hiatus zu mildern" (I,302, 314f; cf. Renou, § 115).

[41] In these cases (nom.si., and *s*-aor.) one could alternatively treat the change to *ṃS* as a process of internal sandhi: thus, *vidvāN + S ÷ vidvāṃS* etc. In the case of the acc. pl. forms, however, one would have no grounds for establishing a morphemic division between the *N* and *S*. The fact that historically *ayāNS*, as a 3si., derives from a form with final **-nst*, and that grammatical congruence might require the establishment of a final basic *T* in internal sandhi, is irrelevant for descriptive, external sandhi purposes, since no reflexes of the original final remain.

sandhi may have been influenced by that of the more frequent 3si. forms (as *ahan* < **eg^{w}hent*), and follows the pattern appropriate to such forms (thus *ahannahim* for expected *ahaṃähim*).

A further exception concerns the fact that the nom. si. in (terminal) *-ān* of stems in *-nt-* other than pres. participles (as *-vant-*, *-mant-*, *mahānt-*) nevertheless has the special Vedic sandhi in the prevocalic environment — presumably under the influence of the terminally identical ending of the nom. si. of stems in *-ṃs-*. Thus the nom. si. of *padvant-* would come to he allotted to the same sandhi category as that of *vidvāṃs-*, for the reason that their terminal endings were identical, viz. *padvān*, *vidvān*. And as the basic form of the latter is *vidvāNS*, so also that of the former, in spite of historical and grammatical evidence, must he stated for Vedic as *padvāNS*.[42]

It is to he emphasized that the special prevocalic sandhi after a long vowel is peculiar to Vedic, so that the distinction of hasic forms with final *N* and with *NS* (like that of *N* and *NN* or *NT*: see p. 56) is required only for that and not for the classical language; and that, whilst in the majority of cases the *NS* is historically and grammatically justified, it is primarily estahlished on the hasis of synchronic sandhi alternation.

[42] Cf. Wackernagel, III, 257. It could be argued (cf. Bartholomae, *WZKM* xxii, 340f.) that the development here is historically regular and phonetic, viz. that **-ānts* > *-āns*. In favour of this view is quoted Av. θwâvąs = *tvāvān* < **tvāvānts*; but it should be noted (a) that the Avestan development applies equally after a short vowel (e. g. *hąs* = *san* < **sants*), (b) that it can equally well be simply a case of the regular Av. change of **ts* > *s* (cf. *stavas* < **stavats*), and (c) that this assumption for Vedic involves an internal *loss* of a stop between nasal and fricative whereas in external sandhi there is just such an *insertion* (see p. 84).

IV

CONSONANT + CONSONANT

This class of junction presents various sandhi complications, resulting from the diversity of possihle combinations of final and initial consonant types, in regard to hoth place and mode of articulation. The alternations, in accordance with the principles discussed on p. 17, involve primarily the final consonants; and of these *S*/*Ṣ* and *M* show particularly wide variation. This is theoretically to he expected, since it is precisely these consonants which as word-finals have the highest frequency of occurrence,[1] and which consequently, in terms of information theory, have the highest redundancy and carry the least information. As such they are least resistant to the variations imposed upon them by the following, minimally redundant initials.[2]

There is a parallel to this in Latin, where *-m* is replaced hy a nasalization of the preceding vowel (therehy permitting elision hefore an initial vowel), and *-s* in early Latin is lost (or replaced hy aspiration of the preceding vowel?), so permittinglight qu antity

[1] A random sample of bymns from the *RV* showed, for the four highest final frequencies: *S* 140/*Ṣ*41, *M* 114, *T* 32, *N* 14. Frequencies for the other possible finals in this count were:- *R* 9, *Ṭ* and *Ṅ* 1, *K* and *P* 0. It is the frequency *in the final position* that is here relevant; so far as the overall occurrences are concerned, there is no such significant gap between the frequencies of the first two items and the next in rank. Cf. Allen, "A note on "instability" ", *MF*. 1960, 27f.

[2] See further Guiraud, *Problèmes et méthodes de la statistique linguistique*, ch. IX. The principle thus assumed is not necessarily in conflict with a possible tendency for contrasts which carry excessively meagre functional loads to be neutralized (if their terms are sufficiently similar), and vice versa; cf. Martinet, "Concerning the preservation of useful sound features", *Word*, IX, lff.; Hockett, *Manual of phonology*, 215ff.; Vachek, "On the interplay of quantitative and qualitative aspects in phonemic development" (*Z. f. Anglistik u. Amerikanistik*, 5, 1957, 1), § 6. On the concept of functional "yield" or "burden" cf. also Martinet, "Function, structure and sound change", *Word*, VIII, lff.

after a short vowel before an initial consonant.[3] As in Sanskrit, the original *m* and *s* were by far the most frequent finals.[4]

(a) *Final ḥ* ("*visarjanīya*") [W. 170ff.]

As was seen in the preceding chapter, the terminal final does not here provide an unambiguous starting-point, and we must operate with the basic finals *S*, *Ṣ* or *R* as the case may be.

We may first consider those cases where the initial is voiced (voiced stop, nasal, semivowel, *h*); and the simplest case is here presented where the final is *R* [W. 178f.], since this, being itself voiced, requires no explicit process of voicing:

Ex: *akaR + Jyotiḥ ÷ akarjyotiḥ*

The only exception arises where the initial consonant is also *R;* a geminate *rr* is avoided in Sanskrit, and only a single *r* survives: but if the preceding vowel in the basic form is short, there is a lengthening in sandhi which serves to maintain the heavy quantity of the syllable:

Ex: punaR + Ramate ÷ punarramate → punāramate

A basic final *S* or *Ṣ* before a voiced initial follows the pattern of the preceding chapter. Thus *Ṣ* shows a process of voicing ÷ *ẓ*, and with the elimination of voiced friction the result is identified with *r* [W. 174]:

Exx: *manuṢ + Gacchati ÷ manuẓg° → manurgacchati*
agneṢ + Manve ÷ agneẓmanve → agnermanve
sarvaiṢ + Guṇaiḥ ÷ sarvaiẓg° → sarvairguṇaiḥ

This resultant *r*, just as (*R*÷) *r*, is subject to the rule against gemination: thus

nṛpatiṢ + Rājati ÷ nṛpatiẓr° → nṛpatirr° →nṛpatīrājati

Similarly a final *S* [W. 175ff.] shows voicing before a voiced consonant; and this, with the elimination of voiced friction, is lost

[3] Cf. F. Sommer, *Handbuch d. lat. Laut- u. Formenlehre*, 302ff.

[4] Cf. Guiraud, *op. cit.*, 109ff. on the eventual loss of Latin *-m*; and for other examples of weakening or loss of high-frequency consonants in Romance, Martinet, *Économie*, 137.

entirely. Where the preceding vowel is short, this would result in a reduction of the syllable from heavy to light. Such a disturbance of the prosodic pattern is however avoided by the insertion of a semivocalic glide in place of the vanished *z*, thereby closing the syllable and maintaining its weight. From a general phonetic standpoint one could equally well expect the semivowel to be of [y] or [w] quality;[5] and probably there was an original alternation between these, determined by the nature of the following consonant. But before our earliest records v had in fact been generalized in this function (in contrast with the *y* generalized before an initial vowel: see p. 62). The resultant av (which in preconsonantal position must be considered as pre-Sanskrit: see p. 33) then undergoes the usual development to *o*:

Ex: *nalaS + Nāma ÷ nalaznāma* → nalavnāma > *nalonāma*

It is of interest that in MidIA the sandhi with *-o* became generalized in all environments (as e. g. Sanskrit *putraS* > Pkt. *putto*); but the dialectal occurrence of forms with *-e*[6] indicates a similar generalization of sandhi forms in which a y-closure prevailed; thus (d^x = any voiced consonant):

dharmaS + D^x ÷ dharmazd^x

→dharmavd^x>Skt. *dharmo*(d^x) > Pali *dhammo*
→dharmayd^x> dharme(d^x) > Aśoka (Delhi) *dhamme*

Evidence of a y-closure is also probably preserved in the fossilized Vedic phrase *sūre duhitā* "daughter of the sun" (*sūraS + Duhitā*); it further appears in some cases of internal sandhi where a sequence *aS* is followed by a voiced dental stop:

[5] On the complementarity of [y] and [w] in prosodic function intervocalically see p. 61. It is further illustrated in preconsonantal position in Greek: IE **wekʷ-* has a reduplicated aorist form **e-we-wkʷ-om*, giving regularly Sanskrit *avocam;* the corresponding Gk. εἶπον shows that here there was a dissimilation of the two *w*'s, and that this took the form of a replacement of the second by *y* (**eweykʷom*). Similarly **we-wrē-* > **weyrē-* > εἴρημαι.

[6] Notably in Māgadhi and eastern Aśokan inscrr. (but not restricted to the eastern dialects; cf. Mehendale, *Grammar of inscriptional Prakrits*, XXV, 27, 314; Burrow, *Arch. Ling.*, IV, 95). In the literary Prakrit, which may be expected to characterize rather than faithfully to reproduce the spoken dialect forms, the *-e* development is restricted to the nom. si. masc. of thematic nouns (cf. J. Bloch, "Asoka et la Magadhi", *BSOS*, VI, 291ff.).

Ex: *aS + Dhi ÷ azdhi* → aydhi > *edhi* (cf. Avestan *zdī*)[7]
This development probably depended, in acoustic terms, on the "acute" quality of the dental, and one may note a development to *o* internally before a retroflex in *ṣoḍaśa, voḍhum*.[8] The matter cannot be tested before consonants of other series, since the fricative is there either replaced by a stop, or, as the final of a stem which could stand as an independent word,[9] is liable to be replaced by the external sandhi form:[10]
Exx: (a) *madgu-, majjati* (cf. Lith. *mazgóti*); *uṣadbhiḥ*.
(b) *manojū-, manobhiḥ* (cf. nom. acc. si. *manaS*).

The representation of *-aS* by *o(e)* in Sanskrit sandhi, and more generally in Prakrit, has led to considerable speculation about the processes involved, much of it unrealistic and phonetically implausible. A fuller discussion is presented in Appendix A.

Where the preceding vowel is long (*ā*), the elimination of the voiced fricative would not entail any reduction of quantity, since the long vowel itself suffices to ensure a heavy syllable. No semivocalic closure is therefore to be expected in such cases:
Exx: *hatāS + Gajāḥ ÷ hatāzg° → hatāgajāḥ.*
aśvāS + Vahanti ÷ aśvāzv° → aśvāvahanti.
The fact that in the position before an initial *vowel* (pp. 61ff.) *z* is replaced by a semivowel even after *ā* is of course irrelevant; for in that case the semivowel has the function of bridging a hiatus

[7] Cf. also e. g. *seduḥ, nediṣṭha-*, beside Av. *hazdyāt, nazdišta-*. One may compare the Lesbian τοίς,ταίς < **tons, tans*, with *y*-diphthongal closure compensating for the loss of the nasal.

[8] Cf. Marsh, "The voiced sibilants in Sanskrit", *JAOS*, LXI, 45ff. *ṣaṢ + Daśa ÷ ṣaẓḍaśa;* the voiced fricative is here completely eliminated (and not replaced by *r*), since retroflexion is already ensured by the following (assimilated) *ḍ*. The quantity of the syllable is then maintained by a *v*-closure: thus *ṣaẓḍaśa* > ṣavḍaśa (note however Torwali *ṣēīś*, presumably < **ṣeḍaśa* : Morgenstierne, *AO* viii, 309). Similarly *vaH* (<IE**weĝh-*) + *Tum ÷ vaẓḍhum* → vavḍhum > *voḍhum*. For two rare cases of simple lengthening of the vowel (*tāḍhi, sāḍha-*) see p. 94n63.

[9] Cf. Pisani, *Rendiconti ... Lombardo*, LXXXIII, 63ff.

[10] As regularly in compounds — thus before a dental in *ojo-dāḥ* (cf. Av. *aogaz-dastəma-*).

(i. e. maintaining the number of syllables), and not, as here, of maintaining quantity.

There remain the cases where the basic final *S, Ṣ*, or *R* is followed by a voiceless initial consonant; and here the processes vary considerably according to the initial. So far as the earliest forms of this sandhi are concerned, our basic and not the terminal forms are relevant. Originally *S* and *Ṣ* were represented by *s* and *ṣ* in the position before an initial voiceless stop or fricative of the same class (i.e. before *T(h)*, *S* and *Ṭ(h)*, *Ṣ* respectively), and also before stops of the labial and velar series (i. e. *P(h)* and *K(h)*). It is relevant that the labial and velar articulations do not involve any action of the front part of the tongue, such as would interfere with the musculature of the preceding fricatives (which are both apical); articulations of this kind may conveniently be referred to as "non-interfering", and those of the central series (dental, retroflex, palatal) as "interfering" — as indeed they were by the ancient phoneticians.[11] Final *ṣ* also appeared in certain cases before the representative of an initial basic dental; the latter, however, was itself then subject to a process of retroflexion, so that it in fact did not interfere with the articulation of the retroflex fricative. But except where both consonants are of the same class, this form of sandhi survives only in Vedic, and there mostly in cases where there is a close grammatical, semantic, or accentual relationship between the two words;[12] it survives also in a fossilized form in certain compounds, in some cases even into the classical language:[13]
Exx: *divaS + Putraḥ ÷ divasputraḥ*
dyauṢ + Pitā ÷ dyauṣpitā
yájuS + Karoti ÷ yájuṣkaroti
agníṢ + Te ÷ agníṣṭe
(and in compounds: *namaS + Kāra- ÷ namaskāra-; āyuṢ + Kāma- ÷ āyuṣkāma-; duṢ + Tara- ÷* Ved. *duṣṭara-*, but cl. *dustara-*).

[11] "*viṭhna-kṛt-*": cf. Allen, *BSOAS*, XIII, 940.

[12] Cf. Oldenberg, 472ff. (esp. 473, n. l.); B. Ghosh, "A law of visarga-sandhi in Ṛksaṃhitā", *IL*, VII, 54ff; also P. viii.3.34–44 ("*visarjanīyasya ... kupvoḥ ... ṣaḥ ... iṣuṣoḥ sāmarthye*" — e.g. *yajuṣ kuru*).

[13] Note the isolated occurrence even of final *ś* in the compound *viśpati-* (beside cl. *viṭpati-*).

At a very early stage, as shown by compounds, it is probable that *R* also was represented by *r* [W. 178c] in these environments:

Exx: *pūR + Pati- ÷ pūrpati-*
vāR + Kārya ÷ vārkārya-
vanaR + Sad- ÷ vanarṣad-
punaR + Tta- ÷ punartta-

The treatment here in fact parallels that of internal sandhi (cf. *pūrṣu, piparṣi, pūrta-, arpayati*, etc.). Later, however, a process of devoicing took effect, and forms such as *catuṣpad-* might be relics of this stage (with *ṣ* as the voiceless counterpart of *r*), though other explanations are possible.[14]

But even at this earliest period, whether we are considering final *S*/*Ṣ* or *R*, there was assimilation to a following "interfering" initial, if we may judge from the evidence of compounds.[15]

Exx: *punaR + Citi- ÷ punaścit-*
punaR + Tati- ÷ punastati-
duṢ + Cara- ÷ duścara-
puraS + Caraṇa- ÷ puraścaraṇa-

Thus before any initial voiceless consonant of the three "interfering" series any basic final which is represented terminally by *visarjanīya* (*ḥ*)[16] is assimilated to the initial, resulting in the homorganic fricative of that series. This process prevails in external sandhi in both Vedic and classical sandhi alike:[17]

[14] Cf. Wackernagel, I, § 284c.

[15] The only exceptions appear to be *RV svarcakṣas-, svarcanas-*. The case of (external) Ved. *āvaR + Tamaḥ ÷ āvartamaḥ* may only be apparent; it could well stand for *āvarttamaḥ*, with preservation of final group *-rt*, as sometimes in Vedic (cf. Wackernagel, I, § 261; see also p. 57 above).

[16] Or, differently formulated, any final which in its voiceless form had a fricative articulation, viz. *S(s), Ṣ(ṣ), R(ṣ)*. A liquid, even if frictionless in its voiced variety (as Skt. *r*), is liable to friction when devoiced, in consequence of the greater breath-force.

[17] It might be expected that a parallel development would have been followed in the position before voiced consonants (pp. 70ff.), thus e.g. *mitraS + Janān ÷ mitraźjanān* → (with loss of friction but maintenance of "palatality") mitrayjanān, replaced (cf. p. 71) by mitravjanān > *mitrojanān*. But in that case we should expect also e.g. *agniṢ + J° ÷ agnižj° → agniyj° = agnīj°*, whereas in fact we find *agnirj°* etc. This would mean that the voicing process and loss of voiced friction must both be applied before the assimilation of

Exx: *tasyāS + Chāyā ÷ tasyāśchāyā*
śatruṢ + Carati ÷ śatruścarati
svaR + Ca ÷ svaśca
pādaS + Ṭalati ÷ pādaṣṭalati
dvāR + Tat ÷ dvāstat

The assimilation of an initial dental to a retroflex final (*Ṣ*), which has already been mentioned as a characteristic of Vedic, was in fact mostly confined to those cases where the second word was a pronoun, and by classical times had been entirely superseded, under the assimilation of finals to "interfering" initials: thus e.g.

cakṣuṢ + Te ÷ cakṣuste

Before a fricative initial (*Ś, Ṣ, S*) the same process of assimilation would naturally result in a double fricative. And whilst this is the original sandhi form, and is optionally preserved, the later tendency is for the word-final, i.e. the first of the two fricatives, to be weakened to its terminal form of *visarjanīya*.[18]

Exx: *indraS + Śūraḥ ÷ indraśś° > indraḥśūraḥ*
tāS + Ṣaṭ ÷ tāṣṣaṭ > tāḥṣaṭ
manuṢ + Svayam ÷ manuss° > manuḥsvayam
punaR + Śatam ÷ punaśś° > punaḥśatam

The earliest introduction of *visarjanīya* in this environment (in the late part of the *RV*) significantly concerns junctions in which the

place, which will thus be precluded. It would thus suggest that our descriptively intermediate *z* (*manuzgacchati* etc.) and *z* (*nalazṇāma* etc.) may have no historical basis so far as external sandhi is concerned; and it may well be that voicing and loss of friction were here simultaneous, non-friction being automatically involved in the lesser tension and breath-force of the final voiced articulation.) The historical reality of voiced fricatives medially, however, is shown by their occurrence in Iranian and by the effect of a voiced retroflex fricative on a following dental in Sanskrit (e.g. *mīḍha-* beside Av. *mižda-*).

[18] The *visarjanīya* may be viewed as an aspiration of the vowel rather than as a consonant. Internally it does not hinder the retroflexion of *S ÷ ṣ* after a close vocalic articulation (cf. p. 57); thus the loc. pl. of *haviṣ-* is *haviḥṣu* (not *haviḥṣu*). This state of affairs is preserved in composition in e.g. the Vedic *duḥṣaha-* (= cl. *duḥsaha-*), *tiḥṣaṃrddhatva-*, and occasionally in external sandhi, as Ved. *nakiḥṣaḥ*. The status of aspiration is then comparable with that of nasalization (cf. neut. pl. *havīṃṣi*, not *havīṃsi*) — though it must be admitted that the forms in question could also be explained as a reflex of the intermediate stage *haviṣṣu* etc.

first member is an enclitic (e.g. *naḥsapatnāḥ*),[19] and where the accentual divorce of the two words is particularly marked (cf. also pp. 29, n.2, and 77).

When the initial fricative is followed by a stop, the final fricative may be lost altogether, by an expected process of simplification: Exx: *vāyavaS + STha ÷ vāyavasstha → vāyavastha*
In such cases the stop ensures that the preceding syllable maintains its heavy quantity. The process is also seen in compounds such as Ved. *duṢ + STuti- ÷ duṣṭuti*.[20] It is further prescribed by some authorities in cases where the initial is followed by other consonants, i.e. semivowel or nasal, as *kṛtaS + ŚRavaḥ ÷ kṛtaśravaḥ*, and is supported by the compound *nisvaram* (*niṢ + SVaram*). But in this case the process is less common, a fact which may ultimately be attributable to the syllabic potentialities of semivowels and (in IE) nasals; by "Sievers' Law" we should expect that originally in such sequences (i.e. after a heavy syllable) the semivowel or nasal in fact had its syllabic value, and in that case there could be no simplification of the double fricative without entailing a change of quantity.[21]

In fact in this context one is probably begging the question when one speaks of the loss of the final fricative, since the process could equally be viewed as resulting in the loss of the initial.[22] The ancient authorities certainly support the former view, and it is in accordance with the "weak" status of final position; but the question really only arises for graphic and exegetic purposes, i.e. in deciding how to divide the words in a written text. There is no reason to assume that grammatical and phonological boundaries will necessarily coincide, and the single fricative may equally well be viewed as belonging to both the words involved.

[19] Cf. Renou, § 145.

[20] The Ved. *iṣastut-* is also analysed by the *padapāṭha* as *iṣaḥ-stut-*, i.e. *iṣaS + STut-*, but the first element here might equally be simply *iṣa-*.

[21] Cf. Edgerton, *Lg.*, XXXIV, 445ff.

[22] Edgerton in fact suggests a connexion between this type of sandhi and the phenomenon of "*s*-mobile" in IE, whereby roots with an initial consonant (especially a stop) alternate with roots having initial *s* + consonant (as e.g. in Skt. *paśyati* ~ *spaṣṭa-*).

The reduction to the terminal *visarjanīya* variant, which we have seen in the environment before an initial fricative, is further found in the rare case of an initial stop + fricative, e.g.

śatakratuṢ + TSarat ÷ śatakratuḥtsarat

Moreover junctions of this type have the further peculiarity that the final fricative may be lost altogether: e.g.

adhaS + KṢarantīḥ ÷ adhakṣarantīḥ

The junction of a final fricative with an initial stop + fricative is thus treated in the same way as with initial fricative + stop. The basis of this peculiarity is not clear, but it may possibly be a matter of dissimilation. There is perhaps some support for this in the internal sandhi of *-S + S- ÷ -ts-* (*vatsyāmi* etc: cf. also p. 58, n. 17); the development here may have been by way of a transitional stop element, maintaining the morphemic division[23] — thus *-sts-*, in which case the attested *-ts-* represents just such a dissimilation.

We have now to examine the later developments in those cases where the final *S*, *Ṣ* or *R* is followed by an initial "non-interfering" articulation, i.e. a labial or velar stop. Since such initials in no way inhibit the articulation of the finals (or vice versa), no assimilation is necessarily to be expected; and as we have seen, at the earliest period the finals were in fact maintained. Later, however, they were reduced to *visarjanīya*, a reduction that had already been carried through terminally and had spread as an optional variant to the position before an initial fricative. No such development took place before the "interfering" initial stops, where the finals formed part of a homorganic group (*-śc-*, *-ṣṭ-*, *-st-*).

The introduction of the *visarjanīya* forms before non-interfering initials was most strongly resisted (see p. 73) in those cases where there was a close connexion between the two words; and it was most readily introduced in environments resembling the end of a sentence or clause, as at metrical caesurae.[24]

[23] Cf. conversely the IE insertion of a fricative transition between two (dental) stops: see p. 94.

[24] Cf. Oldenberg, 473, n. 1; Ghosh, *op. cit.*, 57. A similar situation is reported by R. Lenz, "Chilenische Studien" (*Phon. St.*, 1893), 24ff. for Chilean Spanish, with e.g. *-s t-*, *-s ṭṣ̌(tr)-*, but *-h p-*, *-h k-* (the last with slight velar friction).

The final *visarjanīya*, as lacking any distinctive oral articulation, was liable to a process of local homorganic constriction under the influence of the following initial stop — i.e. velar friction [x] before *k*(*h*) and bilabial friction [ɸ] before *p*(*h*). These modifications of *visarjanīya* are appropriately recognized by the ancient authorities as "*jihvāmūlīya*" ("radico-lingual") and "*upadhmānīya*" ("afflative") respectively, and occasionally appear with special symbols in Vedic texts (sometimes transcribed as *ḫ* and *ḥ*). Normally, however, the plain *visarjanīya* is written;[25] for even where this modification did in fact occur, the resulting velar and bilabial fricatives were simply conditioned variants, occurring in these particular environments and no others. They thus differed from the assimilated fricatives of the three "interfering" series (*ś, ṣ, s*); for these latter occur independently in other (non-assimilative) environments, and must consequently be recognized as independent phonemes, which required to have their own graphic representation. Nevertheless the development of the velar and bilabial fricative variants served, from a phonetic point of view, to bring the junctions involving initial velar and bilabial stops into line with those involving other stops, in so far as a preceding final fricative was thus in all cases homorganic with the initial.[26]

It would of course be possible to assume, as in the ancient treatises and traditional grammars, that the final fricatives of the "interfering" series also pass through the stage *-ḫ*; but there is neither evidence nor need for this supposition.

In the position before voiceless initials, it is to be noted that basic final *S*, *Ṣ* and *R* are identically represented in later sandhi. And since *visarjanīya* is the terminal representative of all three, it would not in fact here be ambiguous as a basic final; it is

[25] On the phonetic disagreements of various ancient authorities see Whitney on *AP* ii. 40. In *VP* iii. 8-11 the doctrine of *visarjanīya* in these environments is attributed to Śākalya, and that of assimilation to Śākaṭāyana; and it is of interest that these same authorities are quoted as favouring *visarjanīya* and the homorganic fricatives respectively before initial fricatives.

[26] Thus the *AP* in fact simply states (ii. 40) "*visarjanīyasya parasasthāno 'ghoṣe*", "before a voiceless consonant *ḫ* > homorganic".

only developments before voiced initials that make this impossible.

An incidental consequence of the identity in many environments of the sandhi alternants of *S*, *Ṣ* and *R* was that in other environments also they came occasionally to be confused [W. 176c, 178d]. Thus e.g. cases are found of final *aS* ÷ *ar*, and *aR* ÷ *o* before a voiced initial consonant; similarly before vowels e.g. *ahaR* +*Eva* ÷ *ahaëva*, *akṣāR* + *Induḥ* ÷ *aksäïnduḥ*, *avaS* + *Astu* ÷ *avarustu*.

Finally special mention must be made of the pronouns *saS* and *eṣaS*. The general rule is that the final consonant is here eliminated, whatever the nature of the following consonant: thus e.g. *sadadarśa* (for expected *sodadarśa*), *eṣapuruṣaḥ* (for expected *eṣaḫpuruṣaḥ*) — in fact in the *RV* the "expected" sandhi is found only twice. Further, in the case of *-aS* before an initial vowel we have seen that the resulting hiatus was only rarely resolved (p. 62); but so far as *saS* and *eṣaS* are concerned, such resolution occurs in the *RV* in a majority of cases, as e.g. *saS* + *Id* ÷ *sed*. Where the initial vowel is *A*, one finds in Vedic sometimes the "expected" *soä-* (with light first syllable: cf. p. 64), but also *sā-*, with contraction. All these peculiarities tend to indicate that the basic form was in most cases in Vedic not in fact *saS* but *sA*, though with considerable tolerance of hiatus consequent upon the demonstrative function of the word. This supposition finds strong comparative support, since other languages also show forms without final *s* (thus Av. *hā*, Gk. ὁ, Goth. *sa*); the forms with *-S* may originally have been variants used for emphasis and at the end of a clause or sentence (cf. Gk. ἥ δ'ὅς). In classical Sanskrit, however, whilst the *sA* form was preserved before consonants, the *saS* form tended to be generalized before vowels, as e.g. *saS* + *Āha* ÷ *sāha* (without contraction), *saS* + *Abravīt* ÷ *sobravīt* (not *sābravīt*).

Thus the irregularity of sandhi involving these pronouns is, at least for the earliest period, only apparent, and arises from a misstatement, since ancient times,[27] of the actual basic form.[28]

[27] Thus P. vi.1.132, "*etattadoḥ su lopo ... hali*".

[28] See especially Wackernagel, III, § 254.

(b) *Final m* [W. 212f.]

The basic final corresponding to terminal *m* (*M*) is second only to *S*/*Ṣ* in frequency of occurrence; and the variety of preconsonantal alternants is also of a similar order. As *S* is represented by *s* only before a dental, so *M* is represented by *m* only before a labial stop (oral or nasal), where it is in any case homorganic.

Exx: *taM + Buddham ÷ tambuddham*
kṛtaM + Mayā ÷ kṛtammayā

The general principle is that *M* shows assimilation to both the place and type of the following initial consonant; it invariably maintains voice, however, even before voiceless consonants, since in Sanskrit, as in most languages, voice is an automatic concomitant of nasality.[29] Thus before any stop it is represented by the homorganic nasal stop:

Exx: *taM + Kavim ÷ taṅkavim*
uktaM + Ca ÷ uktañca
taM + Devam ÷ tandevam
eṣāM + Nāma ÷ eṣānnāma

This form of sandhi is regular for Vedic, and survives in the classical language, where however it admits an alternative which is discussed below (p. 81).

Before a semivowel the final *M* may in the earliest period have been represented by the terminal *m* (as regularly before a vowel); a possible survival of this sandhi occurs in the compound *samrāj-*.[30] But already in Vedic the assimilative process had given rise to nasalized forms of the semivowels, except before initial *r*.

[29] Voiceless nasals are common in e.g. modern Icelandic, but are best treated in all cases as allophonic variants (cf. Einar Haugen, *Lg*, XXXIV, 60, 72f.; Sveinbjörn Sveinbjörnsson, *Icelandic Phonetics* (*Acta Jutlandica*, V, Suppl.), 55ff.). They are reported as independent phonemes in the Kuanyama language (of S. W. Africa), and in Lifu (of the Loyalty Islands). Their rarity is probably due to the fact that, as suggested by Westermann & Ward, *Practical Phonetics for students of African languages*, 65, "they are difficult to distinguish from each other, as they consist mainly of nasal breath".

[30] Note also the retention internally before *y* in Ved. *yamyamāna-* and replacement (? by dissimilation) by *n* before *v* in *ganvahi*, *jaganvān* (root *gam-*).

Exx: *saM + Yudhi ÷ sayyudhi*
suvargaM + Lokam ÷ suvargaḻlokam
yajñaM + Vaṣṭu ÷ yajñavvaṣṭu

Though the mss. in such cases indicate simply a nasalization of the vowel, the above treatment is attested by the ancient phonetic treatises, particularly in the case of initial *L*. In the case of initial *R* this process would have given rise to the avoided sequence of two *r*'s, the first being nasalized (*-r̃r-*); there is accordingly a simplification to single *r*, and the nasality is preserved as a nasalization of the preceding vowel.[31] Nasalization in Sanskrit automatically involves a non-phonemic but prosodically significant lengthening of a short vowel,[32] and so no compensation is called for in order to preserve the heavy quantity of the syllable:

Ex: *hotāraM + Ratnadhātamam ÷ hotaraṃratnadhātamam.*

In classical Sanskrit this treatment is extended to the position before other semivowels (thus *taṃlābham* etc.),[33] and optionally also to the position before a stop, as an alternative to the homorganic nasal (as *taṃkavim* etc.). It is not clear to what extent this represents a phonetic variation and to what extent it is merely graphic, though its mention by Pāṇini seems to weaken the latter interpretation;[34] it is also possible that this development was fa-

[31] Variously described as "*anusvāra*" (transcribed *ṃ*) and "*anunāsika*" (transcribed *m̃*); the authorities vary in their distribution of these two types of nasalization, and the distinction is not clear. It is just possible that the intended difference is between full nasalization (*anunāsika*) and nasalization of the latter part of a vowel (*anusvāra*), and that the former originally applied to the earliest nasalizations (in the position before fricatives) and the latter to the subsequent cases (replacing homorganic nasals before semivowels and stops). In view of the uncertainty, however, we shall here in all cases represent nasalization by *anusvāra*. See further S. Varma, *Critical studies in the phonetic observations of Indian grammarians*, ch. 9. The hypothesis of end-nasalized vowels has also been made in connexion with the development of final *m* in Latin (cf. Gauthiot, *Fin de mot*, 157), as also of *n* before a fricative (cf. Lenz. *Phon. St.*, 1893, 163).

[32] Some of the ancient authorities express this in terms of adding to the vowel the duration of a consonant.

[33] Pāṇini, however, (viii.4.58–9), appears to permit nasalized semivowels externally and to prescribe then internally ("*anusvārasya yayi parasavarṇaḥ: vā padāntasya*").

[34] Cf. *PAI*, 44f. The writing of *anusvāra* is also general in Vedic mss., as also in printed works.

voured as differentiating this sandhi from that of *-N* + stop where the initial stop was voiced and "interfering" (see p. 84). It is to be noted that in Avestan also a special symbol is regularly used to indicate homorganic nasals before dental, palatal and velar stops, and that it is graphically cognate with the sign for a nasalized vowel in the position before a fricative.

Before a fricative the theoretically expected original development would be to a nasalized (and so voiced) form of the fricative, i.e. to *ž̃*, *ǯ̃*, *ž̃* before initial *ś*, *ʂ*, *s* respectively. But two factors would operate against the maintenance of such forms — first, the characteristically Sanskrit elimination of voiced friction; and second, the universal rarity of nasal fricative articulations.[35] Either factor would lead to the same result — a loss of the fricative element, leaving the nasality to be carried by the vowel. This process is in fact regularly attested in Sanskrit from earliest times: thus

ahaM + *Śṛṇomi* ÷ *ahaṃśṛṇomi*
pūrvaM + *Sattvam* ÷ *pūrvaṃsattvam*

This is a very common development of nasal before fricative in a wide variety of languages;[36] for Iranian one may note e.g. Avestan *dąstvąm* (cf. Skt. *daṃsaḥ*), or *mąθrəm* beside Skt. *mantram* (Av. *ą* = nasalized *a*). And since Iranian shows no avoidance of voiced fricatives, one must here attribute the development to an avoidance of nasalized friction.

The same result (nasalization of vowel) appears also in the case of final *M* + initial *H*. *H* is represented in the attested language by a voiced breathing (or "glottal fricative"), which, as lacking distinctive oral articulation, would be unlikely to involve any modification of a preceding consonant.[37] But a probable stage in the prehistoric development of this consonant was *źh* (with e. g. Skt. *heman-*, *hima-* cf. Lith *žiemà*, Av. *zimō*, etc.);[38] and if the weakening of final *M* was already in progress at this stage, it might be expected to follow the same development before an initial *Źh* as before *Ś*: thus

as *-aM* + *Ś-* ÷ *-aṃś-*
so *-aM* + *H-* < -aM + *Źh-* ÷ -aṃźh- > *-aṃh-*, etc.

The attested value of *h*, however, is relevant to the optional sandhi mentioned by Pāṇini, whereby *-M* + *HM-* and *-M* + *HN-* may ÷ *-mhm,- -nhn-* respectively (e.g. *kiM* + *HNute* ÷ *kinhnute*). This sandhi is clearly due to the lack of oral articulation in the *h*, so that the first relevant articulation is the following consonant (it might even be that *h* and *m*/*n* in such cases were simultaneous articulations).[39]

(c) *Final n* [W. 204ff.]

Although *m* and *n* are both nasals, the basic final corresponding to terminal *n* (*N*) shows much less tendency to assimilative variation than *M*. This difference correlates with the marked statistical gap that separates final *S*/*Ṣ* and *M* from *T* and *N* (see p. 69, n.l.). The most notable feature is the maintenance of dentality before semivowels and "non-interfering" (including homorganic) stops, and of stop articulation before fricatives. Thus before non-interfering (and homorganic) stops:

mahāN + *Kaviḥ*/*Bhāgaḥ*/*Muniḥ* ÷ *mahānkaviḥ*/°*nbhāgaḥ*/°*nmuniḥ*, *etc.* (and *mahāN* + *Devaḥ*/*Nṛpaḥ* ÷ *mahāndevaḥ*/*mahānnṛpaḥ*, etc.

[35] They in fact occur in Icelandic as allophonic, sandhi features in precisely the type of junction we are here considering; cf. also Kemp Malone in *Studies in honor of A. M. Sturtevant*, 9; a similar feature is reported for Argentinian Spanish by B. Malmberg, *Études sur la phonétique de l'espagnol parlé en Argentine*, 112ff. The general rarity of nasal fricatives may be due, as Martinet suggests (*TCLP*, VIII, 282) to the fact that friction requires a degree of air-pressure that can only be obtained if the chamber behind the constriction is air-tight — which it is not in the case of nasalization, owing to the lowering of the velum (cf. also Hockett, *Manual of phonology*, 37; Lenz, *op. cit.*, 162f.).

[36] Cf. *PAI*, 41f.

[37] Note that in internal phonology *h*, unlike e.g. *ś*, is a "non-interfering" articulation from the point of view of the process of retroflexion: thus e.g. *kṛśanam* but *spṛhaṇam*.

[38] A still earlier stage will have been an aspirated stop, jh, as shown by reduplicated forms of the type *juhomi*, where the unaspirated equivalent (by Grassmann's Law) of *h* appears as *j*, and as suggested by its IE and Indo-Iranian origins, viz. < IE **ǵh* and palatalized **ǵh* (as in *hanti* = Av. *jainti* < IE* *gʷhenti*).

[39] Cf. *PAI* 48, 77. The *Mahābhāṣya* extends this alternative to the case of *-M* + *HY*/*HV*/*HL-* ÷ *-ṽhy-*, *-ṽhv-*, *-l̃hl-*.

Before "interfering" stops there is assimilation of place:[40]
Exx: *tāN + Janān ÷ tāñjanān*
tāN + Ḍimbhān ÷ tāṇḍimbhān
(for initial voiceless stops sec p. 87).

Before semivowels, however, even of the "interfering" series, the dental prevails, owing doubtless to their more open and so less inhibiting articulation: thus
mahāN + Yūpaḥ|Rājā|Vṛkṣaḥ ÷ mahānyūpaḥ|°nrājā|°nvṛkṣaḥ, etc.
Before the lateral semivowel, however, there is assimilation in respect of laterality, resulting in a lateralized *n* or, which is the same thing, a nasalized *l*. The latter is in fact the graphic interpretation of the mss. (except where it is simply replaced by *anusvāra:* cf. p. 81), which we transcribe as *l̃*. The process is a feature both of the Vedic and of the classical language:
Exx: *jigīvāN + Lakṣam ÷ jigīvāl̃lakṣam*
trīN + Lokān ÷ trīl̃lokān

Where final *N* is followed by an initial fricative, certain special developments are found. The nasal is in all cases maintained, but the transition to the fricative involves a complex adjustment of articulation; voice, nasality and occlusion are immediately succeeded by voicelessness, orality and friction. The glottis must be opened, the velum raised, and the oral closure relaxed simultaneously if an abrupt transition is to be made. It is therefore not surprising if there should be some failure in synchronization. In some types of English speech, for example, when *n* is followed by *s*, there is a tendency for the relaxation of the oral closure to be delayed; there is thus a point at which one hears an intermediate voiceless oral stop articulation [t], as in [fen^{t}s] (for standard [fens]) = "fence". This "intrusive" [t] is in the nature of a transitional glide bridging the two dissimilar articulations. Precisely such a transition[41] was regular in Sanskrit external sandhi, and indicated

[40] In Vedic the mss. sometimes show *-n* before a palatal initial stop (the retroflex initial is not there attested), but this may be a purely graphic peculiarity, perhaps related to the non-phonemic status of *n̄*.

[41] Termed "*antaḥpāta*", "insertion", by RP iv. 19.

as *t*, so that e.g. *tāN + Sam ÷ tāntsam*. The ancient authorities mostly attest this pronunciation, but written forms without the oral stop are also common (*tānsam* etc.); the latter might represent an alternative pronunciation, or may simply involve graphic omission of a glide which was automatic in speech.

So far we have considered only the case where *N* is followed by a dental fricative (*S*); where a palatal fricative (*Ś*) follows, certain further complications arise. If there is no transitional glide, the nasal is simply assimilated to the place of the "interfering" fricative,[42] as *svapaN + Śete ÷ svapañśete*. If the glide is inserted, we should expect it to take the form of a palatal stop, thus *svapañćete* (parallel to *tāntsam* etc.) — a stage in fact established intermediately (and apparently optionally) by Pāṇini.[43] What we in fact find, however, is *svapañchete*,[44] with an aspirated palatal stop (*ch*) instead of the expected sequence of stop + fricative (*ćś*).

The explanation of this peculiarity is probably as follows. The articulation of a palatal stop involves a more diffuse area of contact, and perhaps a less flexible musculature, than that of other stops. The release tends therefore to be less abrupt — a fact that would account for the very common development of palatal stops to affricates (as e.g. in the modern Indo-Aryan languages). So far as Sanskrit *c* and *j* are concerned, we have no reason to assume that they were other than pure stops, without appreciable affrication.[45] But in the case of an aspirated palatal, the slowness of the release may well have given rise to some degree of local friction during the aspirate phase of the articulation,[46] while the tongue was still not fully disengaged from the palate. This would be particu-

[42] In classical Sanskrit there appears to be no assimilation of a dental stop (nasal or otherwise) to an initial retroflex fricative (P. viii.4.43): thus *tāN + Ṣaṭ ÷ tānṣaṭ* or *tāntṣaṭ* (cf. p. 91, n. 58). Whether this is original we cannot tell, since no occurrence of this type of junction is attested for the earlier language.

[43] viii. 3.31, 4.40; cf. *RP* iv. 12f., 18.

[44] Cf. P. viii. 4.63.

[45] In spite of Whitney on *AP* ii. 17.

[46] In the modern languages the unaspirated palatals are in fact only slightly affricated (the *c* of Hindi *cār* is quite unlike the *ch* of English *char*); and the distinction between aspirate and non-aspirate is very largely a matter of greater or lesser affrication.

larly audible in the case of the voiceless aspirate, in view of the greater breath-force involved. Thus Sanskrit *ch* would in fact have sounded very like *cś* and vice versa — to the extent that they could be identified for all practical purposes. A sandhi form such as *svapañchete* would then be equivalent to the expected *svapañcśete*.

The junction of final *N* with an initial fricative is paralleled by the case of (velar) *Ṅ* + fricative. But whereas *N* shows assimilation of place, this does not apply to the much rarer *Ṅ*:[47] thus

pratyaÑ + Sa ÷ pratyañsa or *pratyañksa*

arvāÑ + Śaśvattamam ÷ arvāñś˚ or *arvāñkśaśvattamam*.[48]

It has been suggested that the sandhi *-N + S- ÷ -nts-* and *-N + Ś- ÷ -ñch-* arose originally from cases where the final nasal derives historically from a group **-nt(s)* (cf. p. 55), and thence spread to other cases; the same suggestion could also be made regarding the sandhi *-Ṅ + S/Ś- ÷ -ṅks/ś-*, in all cases of which the nasal derives from a group **-nk(s)*. This suggestion would render superfluous any phonetic explanation of the transitional stop, since it would simply represent an historical survival. But from the descriptive point of view the phonetic explanation is entirely satisfying, with adequate parallels in other languages (e. g. Latin *sumo* ~ *sumpsi* etc., showing the transitional stop homorganic with the nasal, as in *pratyaṅksa*). Moreover distribution in the texts of forms with and without the transitional stop affords no support for the historical hypothesis; so that even if in fact the stop has an historical basis, it must be admitted that it has spread analogically precisely to those other environments where it would in any case have a synchronic phonetic function.[49]

An historical explanation, however, is certainly required for another type of sandhi involving final *N* which has not so far been

[47] This is in fact the only type of preconsonantal sandhi in which it is necessary to mention *Ṅ* as having other than the plain terminal alternant *ṁ*. This invariability is in accordance with its rarity (cf. p. 69), and there is no need for complicated phonetic explanations (as Bartholomae, *WZKM*, XXII, 341) to account for such contrasts as *prāṅeti* beside *citrāṃupa*.

[48] See further, however, Appx. B.

[49] See particularly Scheftelowicz, *WZKM*, XXI, 118ff. for distribution of the phenomenon, and (119) parallels from other languages.

discussed. In considering the junction of *N* with an initial "interfering" stop, no examples were given in which the stop was voiceless. We might in such cases expect simple assimilation of place, as e.g. *devāN + Ca ÷ devāñca, kasmiN + Cid ÷ kasmiñcid, tāN + Ṭaṅkān ÷ tāṇṭaṅkān*, etc., and similarly the homorganic *abharaN + Tu ÷ abharantu*. Forms of this type do in fact occur in Vedic (e. g. *asmāN + Citrābhiḥ ÷ asmāñcitrābhiḥ*), but the regular classical sandhi inserts a fricative between the nasal and the stop, assimilated to the stop, with reduction of the nasal before the fricative to "*anusvāra*": hence *devāṃśca, kasmiṃścid, tāṃṣṭaṅkān, abharaṃstu*, etc.

It does not seem possible to find a descriptive phonetic justification for these insertions, and in Vedic they commonly do not occur; where they do occur, they are practically limited to the position before the enclitics *ca* and *cid*, where they are almost without exception, and to a few other cases where there is a close connexion between the two words (e.g. *sarvāN + Tān ÷ sarvāṃstān*).[50] Moreover, even in these circumstances they almost only occur where the *N* is preceded by a long vowel; now this is precisely the case already mentioned in connexion with the Vedic sandhi of *N* + vowel (pp. 65ff.), where the terminal *-n* represents historically a simplification of a group **-ns(t)*. For Vedic, therefore, the basic final in the present case also may be considered as *-NS* rather than *-N*. The reduction of the *N* to *anusvāra* is also here regular as a feature of internal phonology.

In the classical language, however, the fricative is further extended by analogy to those forms where it had no historical justification —

[50] Cf. Oldenberg, 427ff. Note also Av. *mašyąs-ča* (beside *mašyōng*) = *martyāṃśca*. Of particular interest is the case of "*asmān-ca tāṃś-ca*", where only the second *ca* shows the "close" form of sandhi; it may be that the different function of the first *ca* in this case dissociates it more from the preceding word — it is noteworthy that the only other exception before *ca* also concerns the first of two ("*paśiñ-ca sthātṛñ caratham-ca*"). One is reminded of the fairly common cases in Latin hexameters where the first of two *-que*'s is scanned heavy "*in arst*" (e.g. Verg. *liminaqué laurusque;* Ov. *liliaqué pictasque*), thereby diminishing its accentual dependence on the preceding word: cf. C. Wagener, "Betonung der mit *que, ve, ne* zusammengesetzten Wörter im Lateinischen", *Neue philol. Rundschau*, 1904, 505ff. (=*Beitr. z. lat. Gr.*, I, 1–7).

as e.g. the locative, 3pl. of verbal forms, nom. si. of pres. part. (< *-*n*, *-nt*, *-nts* respectively). Since this development is regular in classical Sanskrit, there is of course no justification for establishing there any other basic final than *N;* the fricative has then no phonetic motivation and finds its explanation only in historical survival and analogical extension. An incidental advantage of such extension was that it served to differentiate this sandhi from that of *-M* +stop.

The above cases have been concerned with initial "interfering" stops. A similar survival of historical **s* might also have been expected before other (non-interfering) voiceless stops; at the earliest period one should then find *s* (after an open vowel) or *ṣ* (in other cases). The expected *s* is in fact found only in the ("*āmreḍita*") compounded form of acc. pl. *kāNS* → *kāṃS* + *Kān* ÷ *kāṃskān* (cf. nom. si. *kaskaḥ*). For *ṣ* we have the example of:

nr̥NS → *nr̥̄ṃS* → *nr̥̄ṃS* + *Patibhyaḥ* ÷ *nr̥̄ṃṣpatibhyaḥ*

But in the case of both *S* and *Ṣ* the weakening to *visarjanīya* is also attested: e.g.

svatavānS + *Pāyuḥ* ÷ .....*svatavāṃḥpāyuḥ*

nr̥NS + *Pāhi* ÷ .....*nr̥̄ṃḥpāhi*,

and with assimilation to "*upadhmānīya*" the alternative *svatavāṃḥ pāyuḥ*.

In general, however, even in early times, before non-interfering articulations the terminal forms witb final *n* are generally found (as e.g. *nr̥̄npāhi*). It is possible that this difference of treatment before interfering and non-interfering articulations may be due to the weakening of the fricative to a breathing (*ḥ*) in the latter cases; for the result is then a vowel that is hoth nasalized and aspirated (as *-āṃḥ-*, *-r̥̄ṃḥ-* in the above examples: cf. p. 75, n. 18). Such combinations are not without parallel (cf. for instance Hindi *mũh*, *põhcnā* (*pahũcnā*), wbere both nasalization and aspiration are simultaneous with the vowel); but in Sanskrit tbey would be confined to this particular class of junction, and it would not be surprising if they should eventually be eliminated in favour of the terminal forms.

A further reflex of an original final fricative is seen in rare cases in Vedic before voiced initials other than stops, i. e. before semi-vowels and *h* (see also pp. 65f.), when a long vowel precedes. Exx: *-annāNS* → *-annāṃS* + *Rayivr̥dhaḥ* ÷ *-annāṃzr°* → *annāṃrayivr̥dhaḥ; jujurvāNS* → *jujurvāṃS* + *Yaḥ* ÷ *jujurvāṃzyaḥ* → *jujurvāṃyaḥ; dadvāNS* → *dadvāṃS* + *Vā* ÷ *dadvāṃzvā* → *dadvāṃvā*

Here the fricative is voiced before the voiced initial and eliminated in the normal manner, but leaving the nasalized vowel which had regularly developed before it. Generally, however, as always in the classical language, the terminal form with *-n* is here the rule.

These special developments find no parallel in the position before a voiced initial stop. In the case where a basic final Vedic *-NS* is preceded by an open vowel, we should theoretically expect a simple voicing of the fricative to *z*, which is then eliminated: thus

tāNS → *tāṃS* + *Devān* ÷ *tāṃzdevān* → *tāṃdevān*

The actually attested forms *tāndevān*, *tāñjanān*[51] etc. could then be plausibly explained as a purely phonetic replacement of the nasalized vowel by vowel + homorganic nasal before the stop with which it was now in contact.[52] The alternative explanation is that the terminal form was here introduced, with appropriate assimilation of tbe final before an interfering stop (i.e. *tāṃjanān* etc. replaced by *tānjanān* → *tāñjanān*). The latter explanation receives some support from the fact that before a non-interfering initial stop we find not e.g. *-mb-*, *-mm-*, *-ṅg-*, which would be expected by the first explanation, but *-nb-*, *-nm-*, *-ng-* etc. — though this could be considered as applicable only to the position before non-interfering initials, following the pattern of the voiceless initials. The replacement by the terminal form again has the incidental advantage of differentiating (in tbe case of non-interfering initials) this sandhi from that of *-M* + stop (cf. p. 88).

Where other than an open vowel precedes, giving rise to retroflexion of the final fricative, the theoretically expected derivation before a voiced stop would be via *ẓ* → *r* (cf. pp. 66, 70): thus e.g.

[51] The occasional writing with *-ṇj-* in Vedic mss., like that with *-nj-* (see p. 84, n. 40) may have no more than a graphic basis.

[52] Cf. Wackernagel, I, § 281n; Gauthiot, *Fin de mot*, 138.

trīNS → trĪṃS → trīṃṢ + Devān ÷ trīṃẓdevān → trīṃrdevān
„ „ „ + Mūrdhnaḥ ÷ trīṃẓmūrdhnaḥ → trīṃrmūrdhnaḥ

This does not in fact occur; what we find is *trīndevān, trīnmūrdhnaḥ* etc. Tbe replacement bere by the terminal forms could result from a phonetic avoidance of a nasalized vowel followed by a group (such as *rd* or *rm*) which, as consisting (unlike e.g. *st* or *sp*) of semivowel + stop, could not begin a syllable. This interpretation tends to be supported by the case of the same basic final sequences where a voiced consonant other than a stop follows.

Exx: *dasyūNS → dasyŪṃS → dasyūṃṢ + Yonau ÷ dasyūṃẓy° → dasyūṃryonau*; *paṇĪNS → paṇĪṃS → paṇīṃṢ + Hatam ÷ paṇīṃẓh° → paṇīṃrhatam*

In these (rare[53]) examples the theoretically expected sandhi form (with *ẓ → r*) has in fact survived; and the reason for its survival might reasonably be sought in the nature of the consonant-groups involved. In a sequence such as *ry, rh* (unlike e.g. *rd*) the second consonant has a lesser degree of oral constriction than the first;[54] and groups so constituted are particularly capable of initiating syllables.[55] In no case in Sanskrit does a nasalized vowel occur in a position where it could not possibly end a syllable; and this pattern, taken together with the nature of possible syllable-initiating groups, could explain the failure of such theoretical forms as *trīṃrdevān* to occur.

The length of the discussion relating to the sandhi of *N* + consonant might give the impression that *N*, in spite of the statement on p. 83, has a particularly wide variety of alternants. This is not in fact so; the special complexities of the sandhi processes here

[53] The terminal form is elsewhere substituted.

[54] *rh* might be considered simply as an aspirated consonant (assuming that this sandhi is subsequent to the change of *ẓh > h* — cf. p. 83); and *y* involves little more constriction than the vowel *i*. The environments where a reflex of the original fricative has survived after a long vowel in fact comprise all initials belonging to the Pāṇinean *pratyāhāra* "*aṭ*" (cf. Pāṇini's treatment in viii. 3.1–9 and 16–22: "*ru…anunāsikaḥ pūrvasya tu…naḥ…dīrghād aṭi. roḥ… -apūrvasya yo…'śi. vyor…lopaḥ*).

[55] Cf. Grammont, *Traité*, 98ff.

discussed arise only from the survival into historic times of traces of a final consonant-group in wbich the final was not *N* but *S*.

(d) *Final oral stop* (*k, ṭ, t, p*) [W. 156f.; 196ff.]

Here the terminal finals in all cases provide a suitable basis for the sandhi processes, and the basic forms may be stated as *K, Ṭ, T, P* respectively. The most general principle is that the finals are voiced before voiced initials and voiceless before voiceless initials. It is true tbat the terminal finals represent a neutralization of the voiced: voiceless (and aspirated: unaspirated) oppositions occurring in non-final environments, and that e. g. terminal *t* may represent an original **t* or *d;* so that it might be suggested that we in fact have both voiceless and voiced basic finals (*T, D* etc.), and even aspirated and unaspirated, but that all are represented by voiceless unaspirated stops before voiceless initials and terminally,[56] and by voiced unaspirated stops before voiced initials — a method actually followed by Pāṇini.[57] From the standpoint of purely external sandhi, bowever, there is no means of distinguishing a final opposition of voiced: voiceless or aspirated: unaspirated in any environment, and so no justification for setting up more than one series of basic finals (cf. p. 52).

In many cases no assimilations of place of articulation are involved:

Exx: *triṣṭuP + Tu ÷ triṣṭuptu*
havyavāṬ + Juhvāsyaḥ ÷ havyavāḍjuhvāsyaḥ
arvāK + Rādhaḥ ÷ arvāgrādhaḥ
gamaT + Vājebhiḥ ÷ gamadvājebhiḥ

Tbe only exception to this is found where a final dental (*T*), by far the most frequent of the oral stops, is followed by an initial interfering stop or (palatal)[58] fricative; in such cases (as in that of final *N*) there is assimilation to the following initial.

[56] But see p. 97.

[57] viii. 4.53–5 ("*jhalāṃ jaś jhaśi car kharī*")

[58] But not retroflex (cf. p. 85, n. 42): thus e.g. *agniciT + Ṣaṇḍe ÷ agnicitṣaṇḍe*.

Exx: *taT + Ḍhaukate ÷ taḍḍhaukate*
uT + Carati ÷ uccarati
etaT + Chattram ÷ etacchattram
vidyuT + Jāyate ÷ vidyujjāyate

When final *T* is followed by initial *Ś*, the expected sandhi sequence would be *-cś-*.[59] This, as we have seen (p. 85), forms an affricate to which the aspirate *ch* is equivalent. The biconsonantal structure is however maintained by gemination, so that e.g.

vedaviT + Śūraḥ ÷ vedavicchūraḥ

There is something of a parallel to this in English. In a word such as *hatchet* (phonetically [hatšit]) the [tš] is a single palato-alveolar affricate consonant; in a compound such as *hat-shop* (phonetically [hat-šop]) there is an assimilation of the [t] to the [š], and the articulation of the group differs little from that of the single consonant [tš]. Both the [t] and [š] elements, however, have greater duration and muscular tension, which serve to signal the presence of a juncture.[60]

But whilst the above explanation is plausible enough, another possibility will be considered in connexion with certain less familiar sandhi phenomena at Appx. B.

In all other cases the assimilations of final stops to initials are of type and not of place. The most common of these concerns the positions before an initial nasal. The primary assimilation here is of voice, so that we may expect e.g.

taT + Namaḥ ÷ tadnamaḥ
vāK + Me ÷ vāgme
baT + Mahān ÷ baḍmahān
triṣṭuP + Nūnam ÷ triṣṭubnūnam

But the ancient authorities here prescribe a further assimilation in respect of nasality, which is generally attested in the classical language, though sporadic in Vedic — thus *tannamaḥ, vāṅme, baṇmahān, triṣṭumnūnam*, etc.

[59] As optionally permitted by Pāṇini (cf. p. 85), and as attributed by the *RP* to Śākalya (iv. 13) as against Śākalya's father (iv. 4).

[60] cf. Lehiste, *op. cit.*, 36ff., where the difference in the duration of the [š] element in the phrases *white shoes: why choose* is of the order 15cs: 10cs.

In the case of *T* there is also a regular assimilation in respect of laterality before initial *L:* thus

taT + Labhate ÷ tallabhate

This is entirely parallel to the lateralization of *N* (p. 84).

The other main peculiarity concerns those cases where a final stop is followed by initial *H*. From the descriptive standpoint *H* is regularly represented by *h*, a voiced breathing; so that one might expect e.g.

vāK + Hutaḥ ÷ vāg hutaḥ[61]

This is indeed found, but the authorities mostly prescribe the replacement of *h* by the voiced aspirate corresponding to the preceding stop: thus *vāgghutaḥ*, etc. This practice is largely adopted, and the explanation of the process is doubtless as follows. There would be a tendency for the biconsonantal sequences *g-h* etc. to be reduced to uniconsonantal *gh* etc., with *h* here forming simply the aspirate component of the stop. The biconsonantal structure of the sequence would then be preserved, as in the case of initial *Ch-*, by gemination.

Exx: *taT + Hi ÷ tad hi* or *taddhi*
ṣaṬ + Hotā ÷ ṣaḍ hotā or *ṣaḍḍhotā*
anuṣṭuP + Hi ÷ anuṣṭub hi or *anuṣṭubbhi*

It may be noted that this process in fact restores a prehistoric structure in so far as the result may be analysed as an unaspirated followed by an aspirated stop. For *h* in all cases results from an original voiced aspirated stop (generally an IE palatal); the original place of articulation of the aspirate, however, is only accidentally restored: thus

IE **wōk^{w}s ĝhutos > vāK + Hutaḥ ÷ vāg hutaḥ > vāgghutaḥ*
**tod dhətom > taT + Hitam ÷ tad hitam > taddhitam*

but also e.g.

**tod ĝhutom > taT + Hutam ÷ tad hutam > taddhutam.*

It remains to observe that in one case of consonant + consonant

[61] It is here necessary to separate the two words, since in the romanized transcription *gh* would indicate an aspirated *g* rather than a biconsonantal sequence of *g* and *h*.

sandhi the "weakness" of word-final position has served ultimately to preserve it from changes that have affected the internal morpheme-finals. In the external sandhi of stop + stop the ancient autborities inform us that tbe final was weakened to the extent of being unreleased (see p. 98), thereby, in the case of similar stops, giving rise to a geminate (as e. g. *-T + D- ÷ -dd-*, *-T + T- ÷ -tt-*, etc.). Internally, however, there seems to have been a tendency (probably already IE) to preserve the integrity of the two similar stops by a brief release of constriction between tbem. In the (only practically occurring) case of dental + dental this would have the effect of producing an intermediate fricative phase of the type **-t^{z}t-*, **-d^{z}d-*[62]. At an early period of Indo-Aryan an original fricative between stops was eliminated [W. 233]: e.g.

a-bhaJ + S + Ta ÷ abhakta[63] (cf. Av. *bāxštā*)
ghS + Ta ÷ gzdha → gdha[64]
śāP + S + Ta ÷ śāpta
ba-bhS + Tām ÷ babzdhām → babdhām[64]

and between dentals

a-chānD + S + Ta ÷ a(c)chāntta

The process is also seen occasionally in compounds, as *ṛK + SThā*

[62] Preserved in Hittite, e.g. *ezt* (=*etst*) < **ed-t*.

[63] There are further examples in e.g. *caKṢ + Te ÷ caṣṭe; taKṢ + Ta ÷ taṣṭa-; taKṢ + Dhi ÷ tāḷhi* (cf. *cakṣate* etc.). It is here not a case (as P. viii. 2.29) of a loss of the velar stop; the velar of the basic form is in these examples derived from an IE palatal (cf. Wackernagel, I, 230); by loss of the fricative the reflex of this palatal is immediately followed by the dental stop, where the regular development is *> ṣ, ʒ* (cf. **weḱ-ti > vaṣṭi; *seǵh-to- > saʒḍha- > sāḍha-/soḍha-*). This is in fact an isolated case where the different origins of Skt. *kṣ* (< IE **ks* or *ḱs*, etc.) can be demonstrated within Indo-Aryan (cf. Thumb, *Hb. des Sanskrit*, 117). And since the extrusion of fricatives did not occur in Iranian, this must mean that Skt. *kṣ* has in fact two sources in the history of Indo-Aryan itself. The supposed loss of fricatives in similar cases in Iranian is an illusion in spite of their deceptive similarity to the Sanskrit reflexes, leading e. g. Bartholomae, *Gr.* I, § 51.3(a) to consider the process as Indo-Iranian. The Av. 3si.*s*-aor. mid. *fraštā* (root *fras-*) = Skt. *apraṣṭa*, past. part. *tašto* (root *taš-*) = Skt. *taṣṭa-*, 2si.*s*-aor. mid. *θwarōždūm* (root *θwarəs-*), are all examples of IE **ḱs(ǵz)* or **ḱḵ*, both of which give simple Av. *š (ž)* in other contexts; so that the development is entirely regular and no question of any lost fricative arises.

[64] It must be acknowledged, however, that the voiced *z* might be expected to be lost in any case.

÷ ṛkthā; uT + SPhuliṅga- ÷ utphuliṅga-; and even in external sandhi in e.g. *ciT + SKambhanena ÷ citkambhanena; puroruK + STuta ÷ puroruktuta;* between dentals *uT + SThuḥ ÷ utthuḥ; tasmāT + STute ÷ tasmāttute* (but also e.g. *vidyutstanayantī*, and in compound *kakutstha-* etc.).

There seems no obvious phonetic explanation for this "extrusion" of a fricative, tbough it may be paralleled in e.g. Greek βδέω (beside Russian *bzdet'*), τετράφθαι for expected τετράψθαι, ἕκτος beside ἓξ etc. But it evidently applied in Sanskrit also to the fricative phase of the group **-t^{s}t-*, hence e.g. *viD + Ta ÷ vitta-*.[65] In Avestan the fricative element was preserved, to the extent that it ultimately prevailed over the preceding stop,[66] as also in the case of an original **-tst-* (hence e.g. *vista-* (root *vid-*); 2pl. *nista* (root *nis-* <**nits-*)[67]). A similar preservation and development is apparently attested in Sanskrit (and so suggests an Indo-Iranian origin) for the voiced group **-d^{z}d-*, so tbat e.g. Ved. imper. *daD + Dhi ÷ *dad^{z}dhi > *dazdhi* (cf. Av. *dazdi*), whence, with regular loss of the voiced fricative and replacement by a semivocalic glide, day(d)hi *> dehi*. Other survivals of this process in Vedic are seen in *dhehi, bodhi, yodhi* (roots *dadh-, budh-, yudh-*); in the latter two cases the development has been of the type *boDH + Dhi ÷ *bod^{z}dhi > *bozdhi > bodhi*.[68]

[65] Not however to the case where the first *t* was a transitional sandhi consonant (as *bhojāN + Stavato ÷ bhojāntstavato*); cf. Scheftelowitz, *WZKM*, XXI, 119n.

[66] Similarly in Greek and Baltic-Slavonic. In Italic, Celtic and Germanic the fricative articulation extends to the whole group (Latin *visus* etc.).

[67] In Avestan this may of course be viewed simply as an example of the regular change ts *> s*.

[68] The historical conversions and reconversions of *o* (< av) are here ignored as irrelevant. The historical process **d^{z}dh >*zdh* must be later than the operation of the internal retroflexion of IE **s* after close articulations: we should otherwise expect e.g. **bozḍhi > bodhi* (cf. from original **zdh*, 2pl. *astoḍhvam* beside 3si. *astoṣṭa*). The possibility here of an analogical introduction of *bodh-* cannot be dismissed; but the fricative development is still necessary to explain the single (instead of double) *dh* (Renou's suggestion (§ 48) of analogical influence form *bodhi* (root *bhū-*) is most improbable). The same chronological considerations apply to the palatalization of IE **s* in Avestan: thus *vista-*, not *-št-*, *niuruzda-* (perf. part. of *raod-*; cf. Skt. *rudh-*), not *-žd-*. The

The above developments may be summarized as follows. In internal sandhi (probably in IE, thence in Indo-Iranian), the integrity of two similar (dental) stops was preserved by a deconstriction, giving rise to an intervening fricative phase. In Iranian the fricative prevailed over the preceding stop in both the voiced and voiceless series. In Indo-Aryan the fricative was extruded in the voiceless series, but prevailed over the stop in the voiced series. In external sandhi, however, the fact that the finals were unreleased meant there was no intervening friction, and no such developments arise. And in fact already partially in Vedic, and regularly in the classical language, analogy has restored *daddhi*, the form which would be appropriate to external sandhi.[89]

Skt. retroflexion and Av. palatalization are in fact only different developments of an original Indo-Iranian process. The change of **tˢt* to *st* is only Iranian, but this does not necessarily exclude the possibility that **dᶻdh* > **zdh* was Indo-Iranian; indeed the avoidance of voiced friction in the attested stages of Indo-Aryan makes it improbable that such a change would there have been independently initiated. The basic discussion of these problems is that of Meillet, "Le groupe *TT*", *Les dialectes indo-européens*, 57ff.

[89] Cf. the regular external sandhi in the compound *śraddhā* (beside *śrat te dadhāmi*, etc.)

V

TERMINAL SANDHI

Since the terminal forms have provided headings for the various classes of junction, and have there been related to the proposed basic forms, little remains to be said in detail of the terminal sandhi itself. The correspondences may be summarized as follows:

Basic final	*Terminal sandhi final*
Vowel or dipthong:	Corresponding vowel or diphthong
S, Ṣ, R :	*ḥ* ("*visarjanīya*" or "*visarga*")
Nasal :	Corresponding nasal
(Ved. *NN, NS* :	*n*)
Oral stop :	Corresponding oral stop.

The basic oral stops have been indicated (p. 91), as traditionally the corresponding terminals, by symbols suggesting voiceless sounds (*K, Ṭ, T, P*). But the ancient phoneticians are by no means agreed on their terminally voiced or voiceless character, and Pāṇini permits either pronunciation.[1] This could reflect a dialectal variation, or it could mean that they were in some way phonetically intermediate between voiced and voiceless. An observation in one of the ancient treatises seems to suggest a lax articulation[2] — i.e. as voiceless stops, but without the tension normally associated with voicelessness. On purely theoretical grounds this would be a reasonable expectation, in accordance with the general tendency to assimilation, since the following silence may be considered as involving neither laryngal nor oral muscular activity.

The terminal position (and final position generally) in Sanskrit is, in Trubetzkoy's terminology, a "position of neutralization" ("*Aufhebungsstellung*")[3] so far as the oral stops are concerned.

[1] Cf. *PAI*, 70.

[2] *Ibid.*

[3] Cf. N. Trubetzkoy, *Grundzüge der Phonologie*, 70ff; also "Die Aufhebung

since the oppositions of aspirate and non-aspirate, voiced and voiceless, are here inoperative, each place of articulation being represented by a single "archiphoneme". This could either be identical with one or other of the neutralized terms (as e.g. in the case of final stops in German), or intermediate between them; the latter case is generally the less common, though well attested — in English, for example, the opposition of tense-voiceless: lax-voiced is neutralized after *s*, where there occurs only the intermediate lax-voiceless.

A further peculiarity of the terminal finals, as reported by some of the ancient authorities, is that they were unreleased, in this respect resembling stops in the position before another stop.[4] It is noteworthy that in the latter position also the lack of plosion is associated with neutralization, since aspiration does not occur before a stop, and voice or voicelessness is determined by the following stop. It may be that in Avestan the sign transcribed as *t̰* denotes just such an articulation.[5]

The phonetic "weakness" of the final stops in Sanskrit leads eventually in MidIA to their complete loss (i.e. complete assimilation to silence, as stops before another stop are completely assimilated to it.) The final stops actually occurring in the ModIA languages are the result of the loss of MidIA final vowels, including those made final by the loss of Sanskrit final consonants — as Skt. *vidyut*, Pāli *vijju*, Gujarati *vīj*.

In so far as the terminal finals show more extensive neutralization than non-terminal (as in the case of *-ḥ* for both *S* and *Ṣ*), it might be attributed to the particularly high degree of redundancy of the former (cf. pp. 17f.).

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der phonologischen Gegensätze", *TCLP*, II, 29ff. (esp. 41: "Zentrifugale Aufhebung"); B. Trnka, "On some problems of neutralization", *Omagiu lui I. Iordan*, 861 (with a particularly close Czech parallel to the Sanskrit state of affairs); also in *TILParis*, II, 153.

[4] Cf. Varma, *Critical studies*, ch. VIII ("*Abhinidhāna*").

[5] See especially Gauthiot, *Fin de mot*, 91f.; G. Morgenstierne, "Orthography and sound-system of the Avesta" (*NTS*, XII, 30ff.), 69.

A note on the expression "in pausa"

This commonly used expression for "in terminal position" would appear to be a neo-Latin coinage, and to have no authority in Latin grammar (where not even the term *pausa* is found). Moreover it is surely (like the Latin *accusativus*, *positione* after Greek αἰτιατική, θέσει) a mistranslation based on the Sanskrit "*avasāne*".

"*Avasānam*" means originally "resting-place", which may be and is viewed either as distinct from the journey that it ends (e.g. > "residence") or as the final stage of the journey itself (> "conclusion" etc.).[6] Linguistically, therefore, it could signify either the final place in the sentence or line, or the pause by which it is followed. The locative *avasāne* could then be taken either in the normal locative sense as "*in* terminal position", or in the technical grammatical sense[7] as "*before* pause"[8] (cf. the technical use of the ablative to mean "after",[9] and the combination genitive + nominative[10] or nominative + accusative[11] to express the derivational relation" >").

The precise meaning of the expression was already argued in antiquity (e.g., but to a rather different purpose, by the *Mahābhāṣya*[12] — with the unhelpful conclusion that in any case its meaning is a matter of common knowledge[13]). It seems in fact likely that Pāṇini himself understands *avasānam* in the sense of "pause", when he combines it in a *dvandva* compound with "*khar*" (= voiceless consonants) and puts the whole into the locative dual (viii. 3.15: "*kharavasānayor visarjanīyaḥ*"); so far as the "*khar*" element of the compound is concerned, the sense of the locative here can

[6] Cf. K. C. Chatterji, *Technical terms and technique of Sanskrit grammar*, I, 254ff..

[7] Cf. P. i.1.66 ("*tasminn iti nirdiṣṭe pūrvasya*").

[8] As e.g. Whitney on *TP* xiv. 15.

[9] P. i. 1. 67 ("*tasmād ity uttarasya*").

[10] P. i.1.49 ("*ṣaṣṭhī sthāneyogā*").

[11] *RP* i. 56 ("*asāv amum iti tadbhāvam uktam*"); cf. B. Liebich, *Zur Einf. in die ind. einheimische Sprachwissenschaft*, II, § 53.

[12] On P. i.4.110. I am grateful to Mr. J. E. B. Gray for his help in interpreting this difficult passage.

[13] Ed. Kielhorn, I, 358 ("*saṃhitāvasānayor lokaviditatvāt siddham*").

only be "before", and it is therefore probahle that the "*avasāna*" element is also to be thus interpreted. Another case where the sense of *avasānam* = "pause" appears to he firmly established is in *RP* xviii. 47, where one is instructed to make an *avasānam* in the middle of stanzas with four *pada's*;[14] on the other hand, in Uvaṭa's commentary on *RP* i.15 *avasāne* is glossed as "*padāvasāne vartamānam*", which, with the further description "*padāntīya-*", must mean "occurring *at the end* of a *pada*".[15]

In any case the Latin "*pausa*"[16] has only the sense of "rest", distinct from the preceding activity itself; and the Latin "*in*" cannot, like the Sanskrit locative, mean "hefore". The expected equivalent of *avasāne* would therefore be either "*ante pausam*" or "*in fine*". The latter expression is found already in Quintilian;[17] and the former is regularly used by Bopp in his *Grammatica critica linguae Sanscritae*. The earliest use of the term "*in pausa*" that I have traced is in Max Müller's *Sanskrit Grammar for Beginners* (1866), whence it passed into Macdonell's *Sanskrit Grammar for Students* (it also appears in the latter's *Vedic Grammar*); before this, however, Max Müller had already used the expression "in der Pause" as a specific translation of *avasāne* in his edition of the *RP* in 1856 (394, p. cxix). Thumb's mode of expression (*Handbuch des Sanskrit*, 120), "vor einer Sprechpause ("in pausa")", seems to suggest a realization that "*in pausa*" is a peculiar conventional term. Wackernagel's statement (I, 301), "Unserm Ausdruck "in Pausa" entspricht ai. *avasāne*", whilst recognizing the correspondence of the terms, does not appear to suggest a derivation of the Latin from the Sanskrit.

[14] "*madhye 'vasānaṃ tu catuṣpadānām*" (cf. 46: "*dvābhyām avasyet tripadāsu pūrvam*").
[15] Similarly the *Tribhāṣyaratna* on *TP* xiv. 15; cf. *Vasiṣṭhaśikṣā*, ap. Lüders, *Die Vyāsa Śikṣā*, 17f. ("*vyañjane 'vasānasthe*"). Elsewhere in the *RP* itself (xi. 60) *avasānam* appears to be used in the sense of the actual terminal form
[16] Whilst "*pausa*" does not occur in the special linguistic sense, the Greek terms ἀνάπαυσις and ἀνάπαυλα are used of a "rest" in music (beside χρόνος κενός), the Latin equivalents being *silentium* or *tempus inane:* cf. W. Christ, *Metrik der Griechen und Römer*, 35ff., 104ff.
[17] ix. 4.93 ("*neque enim ego ignoro in fine pro longa accipi brevem*").

INDO-ARYAN AND IRANIAN *-O/-E*

The sandhi of Sanskrit *-aS* (< **-as*) ÷ *-o* in the position hefore a voiced initial consonant has heen discussed on p. 71. When it is seen that in Avestan also an original final **-as* is represented hy *-ō*, it is tempting to relate the two developments as an Indo-Iranian characteristic. The temptation hecomes all the stronger when one finds that Iranian also displays a parallel to the dialectal and fossilized examples of **-as* > *-e* in Indo-Aryan;[1] for in the Gāθās one finds *ə̄* heside *ō* < **-as*, where the sound transcrihed as *ə̄* has heen interpreted as a half-close front vowel,[2] and some such value is further suggested by later Iranian developments (as in Sogdian and Khotanese).

One may first dispose of two hypotheses which would see in the *e/o* variation of Indo-Aryan something other than alternative reflexes of **-as* (via **-az* > ay/av). In an article of 1882 on "Final *AS* hefore sonants in Sanskrit"[3] M. Bloomfield put forward the suggestion that the development to *o/e* represents a reflex of the original IE **-os, -es*, with preservation of the vowel-qualities and compensatory lengthening consequent upon the loss of the final fricative. This theory quite ignores the fact that already in Indo-Iranian IE **o* and *e* (and *a*) had irrevocahly merged in *a*. Bloomfield, however, was not alone in holding this view; it has heen favoured hy a numher of other scholars,[4] even in recent times;[5] and in supporting Bloomfield's view, Edgerton writes as follows:

[1] For furher examples see S. Konow, *Kharoshthi Inscriptions* (*CII*, II.i), cxii; T. Burrow, *The language of the Kharoṣṭhi documents from Chinese Turkestan*, 4.
[2] H. W. Bailey, *Zoroastrian Problems*, 184ff. Morgenstierne, *NTS* xii, 38, suggests a mid central vowel, closer than *a*.
[3] *AJPhil.*, III.
[4] E. g. Delbrück, Scherer, J. Schmidt (see Bartholomae, *KZ*, XXVII, 337ff.).
[5] E. g. R. G. Kent, *JAOS*, XXXIII, 259ff.; F. Edgerton, *Lg.*, *V*, 266f.

No other satisfactory explanation of the phenomenon has ever been proposed.... If a uniform Aryan *az* has become (usually) *o*, or (sometimes) *e*, and if this distinction has no relation to the IE precedents of that *a(z)*, then how is this astonishing fact to be explained? That Aryan *a* (or *ā*) should change into either *e* or *o* is sufficiently anomalous (not indeed in general linguistics, but in Sanskrit, where it has no clear parallels), not to mention the additional difficulty of the distinction between *e* and *o*, which appears quite unmotivated by any actually observable facts in Sanskrit.

It is hoped that what has already been said (pp. 71f.), together with the further evidence here presented, will suffice to remove most of the difficulties which lead Edgerton to support so unacceptable a solution. Bloomfield's hypothesis has in fact already been rejected by several scholars, including Oldenberg,[6] Bartholomae,[7] and G. S. Marsh;[8] and it may be mentioned that already in 1833[9] F. Bopp, who had earlier assumed *e* and *o* as well as *a* qualities for the Sanskrit short vowels,[10] abandoned this view as untenable.

Another suggestion is that of J. Bloch,[11] who proposed that the original development of **-as* in Indo-Aryan was to *o*, and that the MidIA forms with *e* represent an unrounding of the original *o*. But such a development is otherwise unknown in Indo-Aryan, and there are no environmental factors to favour it. In search of a parallel one might possibly cite the development of Laconian Greek *-or* (< *-os*) to Tsakonian *-o(r)/-e(r)*; but in this case firstly it is a short vowel that is affected, and secondly the *e* development is limited to and phonetically explained by its occurrence in the position after a dental or alveolar consonant or a close front vowel.[12]

[6] 447ff.

[7] *Loc. cit.* (against such speciously favourable examples as Skt. *sedur*: Lat. *sederunt* B. quotes e. g. *voḍhum:vectum*, *ṣoḍaśa:sedecim*).

[8] *JAOS*, LXI, 47.

[9] *Vgl. Gr.*, § 3.

[10] *Annals of Oriental Literature*, 1819, 7.

[11] "Asoka et la Magadhi", *BSOS*, VI, 291ff. cf. also *L'Indo-Aryen*, 33 (criticized by Turner, *BSOS*, VIII, 206).

[12] Cf. Deffner, *Zakonische Gr.*, § 14. Here again one early writer had attempted to see the survival of a prehistoric *e* (Thiersch, *Abh. philos.-philol. Cl. bair. Akad. d. Wiss.*, I, 1835, 559f.).

We may now return to the question of the relationship between the Indo-Aryan and Iranian developments. On the basis of the striking similarity of their beginning and end points, it has often been assumed that they represent a common Indo-Iranian phenomenon. Konow, for example, suggests a relationship between the NWPkt. *-e* forms and the Saka forms in *-ā*, *-i*,[13] and the same is assumed by Reichelt for the Sanskrit and Avestan *-o* forms.[14] But there are difficulties in the way of such assumptions.

In the first place, as Meillet has pointed out,[15] the Iranian developments are general, and not restricted to a particular phonetic environment — though the possibility of analogical extensions makes this objection rather less strong than it might otherwise be. And secondly, in Avestan, unlike Sanskrit, a similar development to *å* (probably a back vowel more open than *ō*) is also found in the case of original **-ās;* if, therefore, the two Avestan developments are connected, *-ō* can there hardly result from a quantitative compensatory closure (see p. 71), since no such compensation is required after the long vowel.

The most probable explanation of the Iranian forms is that terminal **-as* and *-ās* underwent the same development to *-ah/-āh* as is attested for Sanskrit (*-aḥ/-āḥ*), but that in Iranian (with certain exceptions: see p. 107) this was then generalized. This stage may perhaps be represented in Old Persian. The aspiration of the vowel will then have given rise in Iranian to a change in the vowel quality (in the direction either of [e/ɛ] or, as in Avestan, [o/ɔ]); and finally the aspiration will have been lost (the length, however, as a concomitant of the aspiration, remaining).

For such a development we need not envisage any diphthongal stage; if one wished, however, to assume that the qualitative effects of the aspiration made themselves felt in Avestan at the end of the vowel rather than throughout,[16] one could suppose some degree of

[13] *Op. cit.*, cxiii.

[14] *Awestisches Elementarbuch*, § 173(6).

[15] *Les dialectes indo-européens*, 28ff.

[16] Cf. remarks on "*anusvāra*", p. 81, n 31; and the observation by R. Lenz on Chilean Spanish in *St. Phon.*, 1893, 23.

dipthongal closure; for the original diphthong **au* does in fact develop in final position to monophthongal *ō* (as also **ai* > *ē*), and **āu* possibly to *ā*[17] (as e. g. *vayō* vcc. of *vayu-*, = Skt *vāyo; xratā* loc. of *xratu-*, = Skt. *kratau*). But such an assumption is not essential; in Rajasthani, for example, the vowel [ɛ:] may result hoth from an original diphthong *ai* and from the sequence *ah*, and the Hindi evidence here suggests that the development of the latter has heen *ah* > [sh] (as in Hindi) > [ɛ:], and not *ah* > [ay] > [ɛ:]. And even if the assumption of a diphthongal closure were made for Avestan, it must he emphasized that it would he a qualitative, phonetic consequence of the aspiration, and not a phonological development aimed at the preservation of quantity.

Conversely, it is sometimes assumed that the Sanskrit development of **-as* > *o* took place via the terminal stage *-aḥ*, the quality then heing a consequence of the aspiration as here suggested for Iranian.[18] But the ahsence of any such development in the case of **-ās* must here he noted, and one would have to assume that in Sanskrit, hut not in Avestan, the long vowel was more resistant to this effect. This is admittedly not impossihle; one may cite the case of the Old English "fracture", which is for the most part restricted to short vowels; and it is true that in Iranian there seems to he no clear evidence for the change of quality of the long vowel outside Avestan.[19]

It is of incidental interest to note that the ancient phonetic treatises, in their statement of the descriptive sandhi processes, invariahly take the terminal form as their starting point, and all but one then treat the derivation of *-aḥ* ÷ *o* as a single process. The *AP*, however, parallels our treatment of Sanskrit in so far as it interpolates a process *ḥ* → *u*, thereby establishing a diphthongal closure,[20] with subsequent monophthongization. This procedure

[17] See however Bartholomae, *BB*, IX, 306f.

[18] Cf. Brugmann, *Idg. Gr.*, § 1005(5); Reichelt, *op. cit.*, § 173(6).

[19] Even in Avestan *ā* shows greater resistance to palatalization than *a* (cf. Morgenstierne, *NTS*, XII, 47).

[20] *AP* ii. 53–4 ("*akāropadhasyokāraḥ*"), as against e. g. *TP* ix.7–8 ("*okāram aḥ sarvaḥ*") — cf. *VP* iv. 41.

is also adopted hy Pāṇini (vi. 1.114), who moreover does not take the terminal form as hasic.

It is sometimes stated that in Avestan one should expect final **-as* to result in *ā* (after the analogy of **-ās* > *ā*).[21] This, however, is not necessary; if the quality of short *a* and long *ā* differed in Avestan in the same way as in Sanskrit (cf. p.30), we might expect the vowel resulting from **as* to have a closer quality than that resulting from **ās*.[22]

There is less temptation to see a connexion in two apparently similar developments if it is found that such developments have taken place independently elsewhere. And this is in fact so in the present case. For the type of development that we find in Sanskrit, i.e. a diphthongal closure compensating for the loss of a consonant, a parallel may he adduced from Italic. In Oscan-Umhrian an original group **kt* had developed to *ht*, and in Umhrian the *h* was ultimately lost, leading to a simple compensatory lengthening of the preceding vowel. But as a result of a later syncope of vowels, there arose a secondary series of consonant-groups; here again in Umbrian the first member of a group *kt* was lost, and this time the quantitative compensation took the form of a diphthongal *y*-closure: thus Latin *agito*: Osc. *actud* = Umh. *aitu*. (There is an identical type of development in British Celtic, as in e.g. Welsh *aeth* heside O. Ir. *-acht*).

This development is later repeated in Romance, where (in the west) Latin *ct* > *yt:* thus *factum* > Fr. *fait*, Cat. *feit* (> *fet*), Port. *feito; noctem* > Fr. *nuit*, Arag. *nueyt*, Port. *noite*. A particularly close modern parallel is found in Provençal, in some dialects of which there is a sandhi alternation "*-s* devant consonne dure ou voyelle, *-ẹ̄* devant consonne molle" (e.g. "ce qu' *es pai* dich").[23] In Portuguese, later more or less "learned" horrowings from Latin underwent a *w*-diphthongization: thus *actum* > *auto*, *tractare* >

[21] Thus Reichelt, § 175(5); Bartholomae, *Gr.*, I.i. § 93.

[22] Cf. Morgenstierne, *NTS*, XII, 48. Saka seems to show a similar differentiation in *-i* < *-as*, *-e* < *-ās* (perhaps originally *-ẹ̄*, *-ẹ̄*): for examples including the Tumšuq material see Bailey, *Hb. d. Orientalistik*, IV.I, 131ff.

[23] Ronjat, *Grammaire istorique des parlers provençaux modernes*, 275.

trautar, doctorem > *doutor* or *doitor, tectum* > *teuto* or *teito*.[24]

The alternation between *y* and *w*-diphthongization is furtber attested in modern Spanish dialects of the New World. Thus in the Argentine *carácter* > *caráuter, acción* > *aición*;[25] in New Mexico *exacto* > *esauto* or *esaito*; *perfecto, facción* > *perfeuto, fausion*, or *perfeito, faisión*, or (with simple lengthening) *perfeto, fasión*.[26] It has been suggested witb some plausibility, as in the case of Indo-Aryan, that the choice of *y* or *w* closure may originally have been determined by tbe phonetic environment[27] but with much subsequent generalization.

Parallels can also be quoted for the type of development assumed for Iranian, with simple change of quality as a result of aspiration. A velarization of the open vowel qnality is reported by Navarro Tomás for Andalusian,[28] the development being approximately [as] > [ah] > [a^h] > [*a*ː] (with lengthening when stressed); similar observations are made for the same dialect by other writers,[29] and for the dialect of Tenerife by M. Alvar.[30] In eastern Andalusian, as reported by Dámaso Alonso in his entertaining and expressively titled monograph, *En la Andalucía de la E*,[31] there is a palatalization

[24] Cf. J. Huber, *Altportugiesisches Elementarbuch*, § 214. See further, M. Pfister, *Die Entwicklung der inlautenden Konsonantengruppe -PS- in den romanischen Sprachen* (= *Rom. Helv.*, LXIX), 123ff. Note also Catalan *cau, pau* < *cadit, pace(m)*, etc.

[25] B. Malmberg, *Études sur la phonétique de l'espagnol parlé en Argentine*, 79; cf. E. F. Tiscornia, *La lengua de "Martín Fierro"*, II (= *Bibl. de Dial. Hispanoamericana*, III), 72ff. (74, n. 2: "En todas partes conviven las formas vocalizadas con *i, u*").

[26] Cf. Hills, *El español de Nuevo México* (= *BDH*, IV), 22; A. M. Espinosa, *Estudios sobre el español de Nuevo Méjico* (= *BDH*, I), 222ff.

[27] Malmberg, *op. cit.*, 80. Cf. *Obras ineditas de Rufino J. Cuervo* (ed. P. Félix Restrepo, Bogotá, 1944), 68.

[28] "Dédoublement de phonèmes dans le dialecte andalou", *TCLP*, VIII, 184ff.

[29] Cf. M. Alvar, *RFE*, XXXIV, 284ff. (with reference, p. 297, to "el plural apofónico"); J. Čalumský, *Slavia*, 1928–9, 750ff. (with reference, p. 753, n.1, to Skt. *ḥ*); L. Rodriguez-Castellano y Adela Palacio *Rev. de Dial. y Trad. Populares*, IV, 398, 589.

[30] *El español hablado en Tenerife* (Madrid, 1959), 28.

[31] Madrid, 1956.

of the open vowel quality, such that final [as] > [ah] > [$ɛ^h$] > [ɛ].[32]

As noted above (p. 104), a similar palatal development is also quotable within ModIA. In Hindi final and preconsonantal *ah* > [ɛh] — thus *kah, kahtā* = [kɛb], [kɛhta], beside *kahā* = [kəha]; in Rajasthani the aspiration is then lost, with lengthening of the [ɛ] — e. g. Marwari [rɛːɳo] = Hindi *rahnā* [rɛhna].

There is thus no necessity for attributing the closure in Avestan (as Meillet, op. cit., 29f; Gauthiot, *Fin de mot*, 118) to an accompanying nasalization;[33] and the Andalusian development tends specifically to minimize Gauthiot's objection that "on ne voit pas... pourquoi la chute de l'élément sourd et très réduit qui suivait la voyelle *-a-* a contribué à lui donner un timbre vélaire".

The preceding discussion has attempted to contrast the Avestan with the Sanskrit phenomena, and to suggest that the former are a consequence of general and not special sandhi developments. This does not exclude the possibility that Iranian may originally have shared in the type of alternation of which reflexes are preserved in Sanskrit. Some evidence for this is to be found in the fossilized sandhi of closely connected words; thus we find *daēvā vīspąŋhō* = Skt. *devā víśve*, and a difference of treatment appears before voiced and voiceless initial consonants in e. g. *yō/yə vā* (= Skt. *yo vā*), *yō ǰanaŧ* (= Skt. *yo hanat*), beside *yas taŧ, yas-ča* (= Skt. *yas tat*,

[32] Cf. Alonso, Zamora, Canellada, *NRFH*, iv, 211; Alvar, *RFE*, XXXIV, 300. The change *-al, -ar* > *-ę*, on the other hand, is probably via **-aį* (cf. Alvar, *RFE* XLII, 279ff.).

[33] It is true that there is a tendency, both generally and in Avestan, for a following nasal to induce vowel closure (Ir. **a, ā* > Av. *ą̄, ą̊̄*); and that medially Ir. **(ā)h-* > Av. *-ŋh-*, before which **ā* > *å*: cf. Av. *daēvåŋhō* = Ved. *devāsaḥ* (but O. P. *aniyāha bagāha*); and such a development finally is not impossible. Some difficulty however arises from the fact that a change of **a* > *ą̊̄* seems not to occur before Av. *-ŋh-* < **-h-*, since this (as pointed out by Morgenstierne, *NTS* XII, 38) suggests that the pre-nasal vowel-closure is earlier than the development of the secondary *ŋ*, and had ceased to operate by the time of the latter. It is unfortunate that the precise interpretation of *ŋ* in this context remains somewhat uncertain (on this much debated point see Morgenstierne, 63ff.). For a Spanish dialectal parallel to nasalization accompanying aspiration, cf. A. L. M. de Guevara, *RFE*, xlii, 154f.

yaśca).[34] It has then to be admitted that the development to *-ō* before voiced initials in Iranian might have arisen by the same process as in Indo-Aryan — i. e. that in this environment already in Indo-Iranian **-as* > **-au*,[35] which was then monophthongized in each branch independently; and that being so, the *-ō* forms elsewhere in Iranian might be explained as an analogical extension from this environment.

But since one must in any case recognize the effect of aspiration, occurring originally in terminal position, in order to explain the Avestan development, subsequently generalized, of **-ās* > *-å̊*, economy and parallelism would favour a similar interpretation of **-as* > *-ō*.

Whilst rejecting certain of Meillet's explanations, we therefore favour his general conclusion that (*op. cit.*, p. 30):

> Le traitement *-o* de **-as* final devant consonne sonore en sanskrit et le traitement *-ō* de tout **-as* final dans l'Avesta sont donc deux phénomènes radicalement indépendants l'un de l'autre.

We would further emphasize the importance of studying the phenomena observable in living languages and dialects, as suggesting possible explanations of prehistoric developments; in this connexion we may quote the words of M. Alvar, in his valuable article "Las hablas meridionales de España y su interés para la lingüística comparada" (*RFE* xxxix, 284ff.), 312, which are particularly applicable to the present case:

> En el mediodía se cumplen fenómenos que tuvieron lugar en lenguas históricas o en épocas remotas de las lenguas de hoy... Las hipótesis, las especulaciones o el caminar en penumbra podrán resolverse muchas veces en el estudio de las hablas vivas.

[34] In e. g. *gāθå̊s-ča*, *havayå̊s*[a] *tanvō*, etc., the *å̊* is probably by analogical transfer from the terminal *gāθå̊*, for an expected *gāθās-ča* etc. For similar "compromises" cf. Jackson, *Avesta Grammar*, § 899; Morgenstierne, *NTS*, XII, 47, 72.

[35] As ** -ās* > *-ā*. This presupposes an intermediate voicing to *z* (Cf. internally *aogaz-dastəma-*, *uz-dānəm*, *dužmanaŋhō*), which is then lost. Such loss is untypical of Iranian in other positions; this difficulty is resolved by Bartholomae (*Gr.* I. i, § 85) by assuming that already in Indo-Iranian the terminal alternants had been generalized in the form "*-aç*, *-āç*", and that it was the voiced form of "ç" (not of *s*) that was lost. But what is "ç"?

APPENDIX B

A SUPPLEMENTARY NOTE ON STOP + FRICATIVE

We have seen that the junction of a final dental *T* with an initial palatal fricative *Ś* is represented in sandhi by an aspirated double palatal stop, *-cch-*. After allowing for the assimilation of final *T* ÷ *c*, this could be interpreted as involving a process of initial *Ś* ÷ *ch* (and not as suggested on p. 92); and it is noteworthy that some of the ancient treatises, apart from viewing the process in this way, also prescribe a similar process for initial *Ś* after final stops other than *T*[1] — e. g. *anuṣṭuP* + *Śāradī* ÷ *anuṣṭupchāradī*. A possible phonetic basis for this peculiarity would be the development of a (palatal) stop element in the transition from the final stop to the initial fricative: thus *-P* + *Ś-* ÷ *-pcś-*, and since *cś* = *ch* (cf. pp. 85, 92), the final result would be *-pch-* etc. Such developments are not unknown elsewhere. For example, beside Old Provençal *sapche* (= Fr. *sache* < V. Lat. *sapiat*) there appears in Rheto-Romance the form *sapt'a*, with a palatal stop element;[2] the fricative in this case has arisen from a devoiced *i̯* semivowel, and similar results are reported dialectally for Rumanian;[3] in Greek also the development of **pi̯* > πτ no doubt has a similar history.[4]

In Vedic, according to our treatises, the process *Ś* ÷ *ch-* was not confined to the position after a labial (as above) and *T*; thus e. g. *vipāṬ* + *Śutudrī* ÷ *vipāṭchutudrī*, *śuK* + *Śuci* ÷ *śukchuci;* and it is further attested in the case of an initial *S*, which, with the appropriate dental stop transition, ÷ *ts-* (parallel to *Ś* ÷ *cś* = *ch*).

[1] *RP* IV. 4; *TP* V.34; *Vyāsa-Śikṣā* 119 (Lüders, 53); and (optionally) P. viii.4.63.

[2] Cf. A. Burger, *Cahiers F. de Saussure*, XIII, 19ff.

[3] Cf. Pavel Beneš, *SbFFBU*, 1958 A 6, str. 65, 107ff; A. Rosetti, in *Mél. Ling.* (Bucarest, 1957), 94

[4] Cf. Allen, *Lingua*, VII. 2, 119,n 36; 129f; C. S. Stang, *Symbolae, Osloenses*, XXXIII, 29; Grammont, *Phon. du grec ancien*, 108.

Tbus, according to some authorities, *ṣaṬ + Sahasrāḥ ÷ ṣaṭtsahasrāḥ, vaṣaṬ + Svāhā ÷ vaṣaṭtsvāhā.*[5]

A similar process must lie behind the otherwise surprising MidIA change of Skt. *-ps-* > Pkt. *-cch-*,[6] i.e. the same result as for Skt. *-ts-* (e.g. *jugupsati* > *juücchaṫ*, as *matsara-* > *macchara-*). The development can here be explained if we assume a transitional dental stop element, such that *-ps-* > *-pts-*, which by normal MidIA assimilation of stops > *-ts-*, thereby falling together with original Skt. *-ts-*.[7] This would then have developed to a (double) affricate of the type [tts], and this in turn to tbe (pre-) palatal affricate [ttš]; [tš] was identified with MidIA *ch* (as *cś* was identified with Skt. *ch*), and thus [ttš] would be represented as *cch*.

In view of the developments discussed above, tbe possibility then presents itself that tbe Sanskrit sandhi of $T + \acute{S} \div cch$ is in fact to be explained in this way ratber than as proposed on p. 92. If this is so, the double stop element of the sandhi will not represent a preservation of the original biconsonantal structure of the junction, but rather a combination of the assimilated final and a transitional stop element to the initial. Some support is perbaps lent to this interpretation by the fact that the development is not confined to the environment after a short vowel, so that the gemination is not always necessary for the preservation of syllabic quantity (cf. pp. 47f.).

The above explanation might also be applied to the isolated example of *arvāṄ + Śaśvattamam ÷ arvāñch°*.[8] The transitional stop element in tbis type of sandhi might be expected to be homorganic witb the preceding nasal (as *arvāṅkś°*: cf. p. 86). and not with the following fricative. But after the development of this

[5] *RP* iv. 17; *TP* v. 33; *AP* ii.8; *VŚ* 108 (Lüders, 53); P. viii.3.29.

[6] The development of *-kṣ* > *-cch-* (as e.g. *ṛkṣa-* > *riccha-*) is not here taken into account, in view of the other MidIA developments, and douhts as to the precise value of Skt. *kṣ* (cf. *PAI*, 78f.); see however Grammont, *Traité de phonétique*, 195.

[7] Grammont, *op. cit.*, 194, reports the same development in the French dialect of Luchon (e.g. *kòps* > *kòpts*, *kòts*).

[8] *RV* 3.35.6, Aufrecht's reading in his second edition (the first edition, based on more limited ms. material, reads *arvāṅś°*).

stop, a further stop element homorganic with tbe fricative might have arisen as in tbe case of *śuK + Śuci ÷ śukchuci* etc. Tbe expected result would then be *arvāṅkch°*, and *-ṅch-* would represent a simplification ol the exceptional group *-ṅkch-*.[9]

Alternatively however, tbis form could represent a non-phonetic analogy. In tbe sandhi of $T + \acute{S}$, as we have seen, there is a process (actual or apparent) $\acute{S} \div c\acute{s} = ch$; and there is apparently (but not actually) a similar process in the sandhi of $N + \acute{S}$. In the former case tbe stop element is perhaps by origin homorganic with the fricative; but in the latter case it is by origin homorganic with the nasal. But the result of assimilation to the initial is that an identical process $\acute{S} \div ch$ appears to apply in tbe cases involving both oral and nasal basic final dental stops (T, N).[10] It is then understandable tbat the same rule might be held to apply in the cases of both oral *and nasal* basic final velar stops (K, $\dot{N}$). Thus, in a proportional formula:

$$T + \acute{S} \div cch : N + \acute{S} \div \tilde{n}ch : : K + \acute{S} \div kch : \dot{N} + \acute{S} \div$$

(*ṅkś* replaced by) *ṅch*.

Such an analogy would in fact be in accordance with the teaching of the *TP* (v. 34), which makes no distinction between nasal and oral stops ("*sparśa*")[11] in prescribing the process of initial $\acute{S} \div ch$.

[9] This would in fact be in general accordance with Vedic ms. practice (e.g. *paṅti-* for *paṅkti-*), and with the teaching of *AP* ii.20 ("*sparśād uttamād anuttamasyānuttame* (*sc. lopaḥ*)"); see further Wackernagel, I, 269.

[10] cf. *AP* ii 17 ("*tavargīyāc chakāraḥ śakārasya*").

[11] Except for the obvious exclusion of M (v. 35).

ANALYSIS

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